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ABSTRACT

This training module was developed in order to help teachers, parents, administrators, and other educational personnel to understand the problems and difficulties encountered by learners with disabilities trying to access microcomputers. The main body of the module describes hardware considerations and strategies for increasing microcomputer access, focusing on specific impairments (including autism, emotional handicaps, hearing impairments, mental handicaps, physical impairments, and learning disabilities), and utilizing a variety of adaptive devices. Activities are provided on such topics as modifying input/output accessibility and the utilization of speech output, touch-sensitive devices, speech input (as an alternative to the keyboard), and adaptive firmware cards and switch controls. Objectives, materials specifications, preparation guidelines, detailed procedures, and lists of recommended resources are included for each activity. Also included are a variety of supplementary handouts and overhead transparencies. (GL)

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Instructional Technology

Adaptive/Assistive Devices

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SECTION A

ADAPTING THE COMPUTER FOR ACCESSIBILITY

INTRODUCTION

Objective: To introduce and discuss the unique needs of various handicapping conditions as they relate to the effective use of computers

Time: 30 minutes - 3 hours depending on selection of activities

Materials:
Videotape "The World of Adaptive Devices" available from FDLRS/Alpha
Transparencies - #A-1 through #A-9
Handouts - #A-1 through #A-7
Videotape "Sara" available from FDLRS/Alpha
Specific software that operates with selected adaptive devices
Electronic Communication Devices - A Slide Series

Display:
Zygo switch kit
Touch sensitive tablets
Joysticks/mouse
Membrane
Template
Speech synthesizer
IntroVoice II

Preparation:

1. Target the needs of participants and prepare only those copies of Handouts #A-1 through #A-1K that are specific to the Exceptionalities served.

2. Read the "Notes for the Instructor" and decide what information will be most appropriate for the intended audience.

3. Review Handouts #A-3 through #A-3c. Determine if the handout will be appropriate for the intended audience. Refer to the Resource Section for a more detailed list of competencies.

4. Secure a copy of the video The World of Adaptive Peripheral Devices and the video Sara. Have a compatible VCR and TV monitor set up. If The World of Adaptive Peripheral Devices is going to be used in the workshop, review and make copies of handouts #A-2 through #A-2C.

5. Make copies of selected handouts.

Preparation:

6. Make a display of selected devices used by handicapped students to access the computer. Select appropriate software to use with each device in case it will be demonstrated.

   Suggested software from the Apple Public Domain Collection includes:

   #127 Hangman (ECHO)
   #155 Unicorn Setup (AFC, ECHO Unicorn)
   #156 Fireworks, Blocks, Wheel (AFC, ECHO, Switches)
   #159 Dragon Modifications (AFC, Switches)

7. Prepare transparencies.

8. Get an overhead projector and screen.

Procedure:

1. If the intended audience needs the background information, discuss the general information provided in the "Notes for the Instructor" on the selection of hardware for Exceptional Students. Refer to the training module on computer literacy for additional information and use Handouts #A-5 through #A-5d taken from Instructional Technology Computer Literacy Module.

2. Referring to selected handouts from #A-1 through #A-1n, briefly relate the characteristics of each exceptionality to access and use of the computer. Identify assets of computer use and potential barriers. Presenter may wish to address specific exceptionalities according to the needs of participants. Refer to local Special Programs and Procedures for Exceptional Students for specific information about each exceptionality.

3. Distribute Handouts #A-3 through #A-3c to participants. Review the competencies. Emphasize that the workshop is not intended to cover all of the competencies. The checklist is to serve as a guide to operations the participants may encounter while using a computer with handicapped students.

   Distribute Handout #A-6 through #A-6b. Explain that this Handout contains a list of some of the resources available that give information on computer use with handicapped students. Emphasize to participants that they can call the FDLRS Instructional Technologist if they need technical assistance.

Procedure:

4. Show the video The World of Adaptive Peripheral Devices. Stop the video at the end of each section and have participants answer the accompanying questions, Handouts #A-2 - #A-2c.

5. Exhibit various adaptive devices.

6. Demonstrate selected adaptive devices and software relating their use to specific handicapping conditions.

7. Show the video Sara. Have participants fill out the Observation Form, Handouts #A-4 - #A-4f. Discuss the results.

8. Try one or more of the activities suggested in the "Notes to the Instructor." After each activity, discuss the simulation with workshop participants. Use Handout #A-7 if the simulation on word processing is used in the workshop.

Resources: Appendices A. F, G, H, I, J, K, R, S, T, U, V and W

Electronic Communication Devices-A Slide Series. Queens College Speech and Hearing Center. 65-30 Kissena Blvd., Flushing, NY 11367

Individualized Curriculum Sequence and Extended Classroom Models for Learners Who are Deaf and Blind. Department of Education, Tallahassee, FL, 1987.

Volume I-B: Florida Statutes and State Board of Education Rules --- Excerpts from Programs for Exceptional Students. Department of Education, Tallahassee, FL, 1986.

NOTES FOR THE INSTRUCTOR

Introduction to Adaptive Devices

To assist districts to define the role of adaptive devices in the education of exceptional students, Wendy Cullar, who was Chief of the Bureau of Education for Exceptional Students, wrote the following memo found in the Technical Assistance Report dated February, 1984.

On November 29, 1975, President Ford signed into law the Education for All Handicapped Children Act, P. L. 94-142. With this legislation, the role of the federal government in the education of the handicapped has significantly increased, and the responsibilities of local and state education agencies has been dramatically altered. The law includes provisions designed to ensure that all handicapped children have a free and appropriate public education available, to ensure that the rights of handicapped children and their parents are protected, and to assist state and local education agencies in providing this education.

A free appropriate public education refers to special education and related services which

a) are provided at public expense under public supervision and direction and without charge to the parents,

b) meet the standards of the state educational agency,

c) include preschool, elementary school or secondary school education, and

d) are provided in conformity with an individualized education program.

Each state and local education agency must take steps to ensure that handicapped children have available to them the variety of programs and services available to nonhandicapped children, including art, music, industrial arts, home economics, vocational education, physical education and nonacademic and extracurricular services and activities.

Almost exactly eight years after the passage of P. L. 94-142, the Congress provided another affirmation of the federal commitment to special education by passing P. L. 98-199, Amendments to the Education of the Handicapped Act. Some of the features of P. L. 98-199 include:

establishment of grants to states for developing and implementing comprehensive plans to provide early childhood education to all handicapped children from birth.

establishment of a new program to stimulate and improve secondary special education and transition to post-secondary education, vocational rehabilitation, continuing education, employment, independent living, and other adult services.

establishment of grants for parent training and information.

emphasis of federal research on the improvement of teaching methodology and curriculum, and the application of new technologies toward improved instruction.

The new emphasis on "excellence in education" and a resurgence of federal programs for special education may converge to push all of us - parents, teachers, administrators, volunteers, and advocates - into the higher quality level of instruction and curriculum offerings that we have dreamed about for exceptional students.

Hardware Considerations for Adaptability

Selecting the right personal computer for an exceptional student to use at home or school is not a simple task. It requires a good deal of time and effort on the part of the buyer(s). You cannot expect to visit one computer store and immediately find the "perfect computer", neither can you investigate every computer on the market. Some preliminary considerations will help you narrow down the field so that you can concentrate your investigation on a few brand names.

Compatibility of hardware components is a very important consideration. For example, an Apple letter quality printer cannot interface with an IBM-PC, but an Epson or NEC printer can interface with many brands of microcomputers. If future upgrading of your basic microcomputer system is a possibility, compatibility of peripherals is very important.

It is normally best to purchase all components from the same dealer, if for no other reason than convenience and servicing. Dealing consistently with one authorized dealer can also facilitate solutions to problems with manufacturer's warranties.

Beware of "look-alikes" sometimes advertised as "IBM compatible" or "Apple compatible". The "look-alike" may or may not offer the same quality and quantity as the original. Disk operating systems, memory size, and expansion capability may vary tremendously.

Browse through some computing journals to get a professional perspective on the different brands and models.

Be mindful of the "bottom line" when buying computers. Some advertised units may seem very reasonable until you read the fine print and realize the monitor or disk drive is not included in the base price. A full start up unit may be very expensive in which case you may choose to buy your computer in "stages". Be sure the computer is expandable and available from a reputable dealer. Also, compare single component prices to combination prices - there may be some surprises! Check with more than one dealer - free enterprise competition is still the name of the game in the market place.

Ask to see the documentation (user information) that accompanies the system. This will serve as your reference for trouble shooting. See if it is well arranged, easy to understand, and covers a wide range of information.

Locate users groups in the area. They can be a valuable source of information about hardware, software, and reliable dealers.

Become familiar with various adaptive peripheral devices such as touch tablets, speech synthesis, and joysticks. Some of these devices are recommended for use by students with specific handicaps. Learn which adaptive devices interface with which computer hardware. This information alone could determine the brand of computer to purchase.

Check the software market and obtain lists of software that have been field tested and recommended for specific exceptionalities. Determine which brand of computer is compatible with the recommended software.

Central Processing Unit (CPU)

The memory capacity is measured in multiples of 16K (kilobyte). One K of memory is equal to 1024 bytes of data (or characters).

Memory capacity frequently determines what software can run. Memory is also an important consideration in the use of some adaptive peripheral devices.

Consider expandability.

Peripherals must be connected to the CPU through "ports." Some models have dedicated ports while others may be totally flexible. Adaptive peripheral devices may be crucial to assisting some handicapped students in accessing the computer. A brand of computer that has several flexible ports can be easily adapted for use by students with different handicapping conditions.

Languages may be built into the CPU, most frequently a brand name version of BASIC. If you are interested in programming customized lessons for exceptional students, ask about the capability of the computer in that area.

Keyboard

Keyboards tend to be similar to the typewriter (QWERTY) keyboards with some additional keys such as:

ENTER or RETURN
CONTROL key
ARROW keys
RESET
ESCAPE
BREAK

Some computers have a 10-key calculator pad in addition to the standard digits on the top row.

A few keyboards have special function keys for saving, loading, or running a program.

The feel or action of a keyboard is an important consideration. Keyboards vary in sensitivity. They also have different shape and size keys depending on the model. These factors will affect the use of the keyboard by some handicapped students.

Some keyboards have a membrane cover or moisture guard to protect against spills or drooling. Others have adaptive covers or templates to help individuals with poor fine-motor coordination.

Monitor or CRT

CRT means Cathode Ray Tube.

Small computers can be connected to a standard television via an RF modulator. Regular televisions have a low resolution and may be hard on the eyes.

Standard monitors are monochrome (one color) and have a black, green or amber background display. These monitors are good for data output.

RGB (Red-Green-Blue) monitors are in-between color and monochrome. They use tones of red, green and blue for graphic displays. Color graphic displays add motivational interest to software programs.

The size of the print on the screen is important. 80-column displays accommodate most data on the screen at one time, but the display may be too small.

A standard for many computers is 40-columns with the 80-column available (for additional money) upon request.

The higher the column number is, the smaller the print appears on the screen. An approximate example of column sizes is given below:

80 column 40 column 20 column

Some small computers use upper case letters only. This would not be appropriate for word processing.

Low resolution graphics divide the screen into blocks referenced by x and y coordinates. Simple geometric patterns work well in this mode but lines are the thickness of a block.

High resolution graphics use dots called pixels. A high resolution Apple has 280 dots across and 192 dots down.

The resolution of the monitor is an important consideration for students with vision problems or reading problems.

Storage of Data

Less expensive computers may have software available in cartridges or data-packs. These tend to be unique to their particular system.

Standard audio cassette recorders can function as storage devices without being permanently dedicated to that purpose. This is the least expensive mode of external storage.

The biggest drawback with cassettes is speed. They must be read sequentially.

The most common form of external storage for personal computers is the floppy disk. It is made of magnetic material and is enclosed in a square, polyvinyl jacket lined with a soft layer of cloth which helps to clean and protect the diskette.

A damaged disk can damage a disk drive.

Floppy disks come in two standard sizes: 5.25" and 3.5". The 5.25" floppy disk remains in active use, however, the new industry standard is the 3.5" disk. It is projected that the diskette will be replaced by new forms of data storage as laser read/write technology improves.

The 5.25" floppy disk can be single or double sided, single or double density and soft or hard sectored. All diskettes are essentially double-sided, but most are packaged in single-sided covers. Double-density can store twice as many bytes per sector. Hard-sectored disks are tangibly marked so that they have more storage space available for data. Soft-sectored disks have sectors marked electronically which take up memory.

As examples, the 5.25 floppy disk remains in use with the Apple IIe series of computers, the IBM PC and PCjr computers, the TRS80 Models III and IV, the TRS Color Computer and the Commodore 64 computer.

The 3.5" diskette is used with the Apple IIGS and Macintosh computers; the IBM Model 25s and 30s, and the Tandy 1000 series.

Improved technology will continue the evolution of storage devices available to consumers.

Prices are higher for disks with greater storage capacity.

A 5.25" floppy disk spins at about 300 rpm. Data is randomly accessed. The read/write head is in contact with the disk surface almost constantly, so beware of damaged disks. The 3.5" disk operates faster and more efficiently.

Drives have four of the same options as diskettes: single or double sided, single or double density. The older computer systems such as the Apple IIe series used single sided, single density drives. Newer system make better use of the technology with double sided, double density drives.

Disk drives can be purchased singly or in double configurations (vertical, horizontal, stacked, or side-by-side).

A single-density 5.25" floppy disk has approximately 126 kilobytes of storage. This is the equivalent of about 40 pages of single-spaced text (with approximately 3000 characters per page). A 3.5" disk can hold almost double that amount of data.

Storage of Data (Continued)

A hard disk is made of rigid aluminum with a coating of magnetic material which is measured in megabytes. A lO-megabyte hard disk made in the mid-1980's could hold over 200 single-spaced pages and spin at about 3600 rpm. This technology has been rapidly improved to become smaller and faster.

Hard disk drives are becoming increasingly available in schools because:

- the cost is declining.
- they are smaller and more portable.
- the available memory is expanding.
- the software developers are releasing hard drive/networked versions of their programs.
- they are easier to manage in an instructional setting.

The time it takes a drive to locate specific data is called "seek time". The average seek time for a 5.25" floppy disk drive is .5 to 1 second. The average seek time for a hard disk drive is less than .005 seconds. One challenge of the computer industry is to improve the average seek time by making the computer work faster.

Printers

Printers are classified by speed, style of print and print product.

Speed is generally measured in characters per second (cps). Low priced printers can range from under 20 cps to 200 cps.

Style of print refers to the way the letters and characters are shaped.

Print resembling that of a typewriter is called "letter quality". This is usually generated on an impact printer called a "daisy wheel" or "thimble" printer with a wide selection of print wheels similar to elements on an IBM typewriter.

"Dot matrix" printers form letters with groups of tiny dots. Cheaper dot matrix printers produce letters that may not be fully formed and may tend to look squared off. Be careful about using documents printed on a check dot matrix. Students with visual closure problems or reading problems can be further confused by this type of print. Most newer dot matrix printers can now produce "letter quality" print.

Dot matrix printers are less expensive and operate in the high end of the speed range. They also offer the option of changing "fonts" (print style) within a document. This is done through print commands in the document. Print options may include boldface, enhanced, double height, double width, and compressed.

Printers (Continued)

Dot matrix printers can be used to print out graphics. This is impossible for letter quality printers since output is limited to specific characters on each wheel.

In the cheaper dot matrix printers, the "descenders" (i.e., lower case letters that print below the line such as 8, j, p and y) do not descend. They are raised so that they are even with other characters. The "hard copy" may be difficult to read and confusing to students.

Printers can type a single sheet of paper or continuous paper called pre-fold or "fanfold" which is perforated for easy separation, and has perforation and holes along the sides.

When printing out a long document, it is best to use a tractor feed to keep the paper in position. The holes along the edges of the paper fit over small pins that advance the paper at the end of the printed line.

Some of the more sophisticated printers have attachments called "sheet feeders". These will hold a stack of single sheets of paper and feed them one at a time to the printer.

Carriage width is another factor to consider. A small printer can only accommodate regular letter-size paper.

Printers enhance the use of the computer by handicapped students because the students can see the results of some of the work they have done using software on the hardware.

Speech Synthesis and Recognition

Speech synthesis is the technology of making a computer talk. It is referred to as artificial or computer speech. Synthetic speech is an alternative output device; that is, another way of getting information from a computer. A hardware device called a speech synthesizer is needed to produce computer speech.

(Examples: Echo II, Type 'N Talk)

Speech recognition (or voice recognition) is the technology of making a computer understand human speech. It is an alternative input device. Speech recognition systems include a specially designed circuit board which can be installed inside the computer or which may be housed in its own unit and connected to a computer with a cable. They also include a microphone and sometimes a headset. Finally, they include software which is used to "train" the system to understand speech.

Most speech recognition systems are speaker-dependent which means that they only respond to one individual whose voice and speech patterns they recognize.

(Example: IntroVoice)

Speech synthesizers and recognizers enhance educational material because people are used to talking and to responding to human speech. For the visually handicapped, synthesized speech is an important aid to communications. They also can be used by young children, nonreaders and physically handicapped individuals.

Computer Accessibility for the Handicapped

Handicapped individuals experience two primary problems in dealing with computer terminals:

- manipulation of the keyboard
- monitor display

The first category, manipulation problems, is usually experienced by individuals with physical handicaps.

The second category, monitor display, can be a problem for visually impaired or for individuals who have trouble dealing with more complex information.

For the visually impaired, the problem is primarily one of having the information presented in the wrong sensory modality.

The complexity of the information display, however, may be a barrier to young children, people with low vision, some elderly individuals, and persons with varying degrees of language or cognitive disabilities.

Individuals who are deaf generally do not experience major difficulty in dealing with terminals unless there is significant and non-redundant information which is presented auditorially.

Strategies for the Visually Impaired

There are three basic categories that may help the visually impaired use computers:

- visual enlargement
- tactile displays
- auditory displays

There are several ways of visually enlarging the output display. One technique is to electronically expand the visual image. This would have a "zoom" effect so it also means that a smaller portion of the screen is seen at any one time.

(Example: Visualtek Large Print Display Processor)

Strategies for the Visually Impaired (Continued)

A second approach is to use a separate magnifying lens. This has the advantage that the display itself does not need to be modified. The magnifying lens can be positioned in front of the display either mechanically or by hand, and moved by the individual to scan over the information on the page.

Tactile displays are another way visually impaired individuals can utilize a computer. Visual enlargement is intended for individuals with impaired vision, while tactile displays are intended for blind persons.

Tactile displays take basically two forms:

actual representation of the characters
braille system

The Optacon is an example of displaying actual representation of the characters. The Optacon is an OPtical to TActile COnverter which utilizes a handheld camera and a small box of electronic components to convert printed characters and letters into tactile representations. The user is actually able to "feel" the various printed characters and read them directly. This approach has the advantage that an individual who is trained in the use of the Optacon can read most types of printed or displayed materials without special adaptors.

With the Braille approach, each character or group of characters is represented by a pattern of raised dots. These can be punched into paper, or presented using dynamic Braille displays which have little pins that move up and down.

(Examples: Electric Typing Finger, Modified Perkins Brailler, Tactile Graphic Display, VersaBraille)

An additional approach for making computers accessible to the visually impaired is the use of auditory displays. With this approach, the information which is displayed visually is also spoken. Talking terminals of this sort are most effective for transferring bulk text. Selection menus and complex visually oriented displays are more difficult to comprehend if simply read from the screen.

(Examples: Abilityphone, Cognivox VI0-1003, Cybertalker 2, Echo II, Handivoice 110, Kurzweil Reading Machine, Minispeak, Sweet Talker, Type 'N Talk, Vert)

Strategies for the Physically Handicapped

For the physically handicapped, the problem of accessing the computer is more complex, due to the greater variety of physical disabilities. As a result, a wide variety of approaches exists, to match not only the varying needs and disabilities, but also the varying residual control that these individuals may have.

Strategies for the Physically Handicapped (Continued)

There are two fundamental approaches to use to help the physically handicapped access the computer:

direct selection
scanning

Direct selection is any technique where the individual directly points to the various choices presented by the computer program.

Direct selection techniques take a wide variety of forms. These techniques may take advantage of whatever body part the individual has best control of including finger, hand, arm, leg, knee, foot, head or eye. A fairly new direct selection technique (i.e., pointing technique) is the use of optical pointers which make use of a beam of light.

This approach has the advantage that the "length" of the beam automatically adjusts to the distance necessary to reach the item being indicated. This results in the individual having to exert less physical control and also allows the individual to stay in a more stable position, rather than having to lean in one direction or another in order to reach his choice, as he would with a mechanical pointer.

When an individual has erratic or involuntary jerking motions, a technique called "auto-monitoring technique" can be used. This approach has an averaging effect which allows an individual to point, even shakily, to an item, and have the system determine which item he is trying to indicate. Even if the individual makes brief excursions onto wrong selections, the system can ignore these false signals and pick out the desired target of the individual's pointing.

(Examples: EKEG Expanded Keyboards, EKEG Remote Keyboards, Express I, Koala Pad, Power Pad)

Scanning is used wherever the individual is unable to point for himself. Items are presented sequentially to the individual. When the desired item is reached, the individual then signals by operating some type of switch. The scanning approach is much slower and more cumbersome and is therefore used only in situations where direct selection is not possible.

To use the scanning technique, an individual need only have some single motion of his body which he can control. This can be the movement of any part of his body or the cessation of movement.

If the number of choices is large, the scanning technique will be slow and cumbersome. If an individual must spell out information, for example, it can take a very long time to scan through the alphabet picking out each letter individually.

Strategies for the Physically Handicapped (Continued)

One of the primary reasons for the extreme length of time required to transfer information using the scanning approach is the fact that the bulk of the time is spent displaying the "wrong" choices. In order to accelerate the scanning process, several techniques have been developed to reduce the number of wrong choices which are presented. These include:

group-item
frequency

Group-item scanning presents groups of items to the individual until he gives a signal indicating that his desired item is in that group. The individual items within that group are then scanned individually until the desired item is reached. The most popular forms of group item scanning are either row-column or page-item scanning.

Items can also be presented in their frequency of use. This technique should be implemented with care since it is sometimes more confusing to have the selection order change each time.

(Examples: Adaptive Firmware Card, Express I, Lighttalker, Zygo Model 100 Communication System, Zygo Switches)

For situations where the individual can only select a small number of items, his total selection space (total number of possible selections) can be expanded by using encoding techniques.

Encoding techniques are one part of a larger category of techniques which use multiple signals from the user in order to increase the "selection space" that an individual would have with direct selection, or decrease the "selection time" of an individual using the scanning approach. (Group item scanning is an example of encoding techniques.)

Cognitive Considerations

In addition to the physical and sensory considerations, there is a need to design systems which can be used by individuals having varying cognitive and language capabilities. Typical considerations are:

use simple visual displays
use large plainly marked input panels
have a minimal number of keys and options
use simple categorical presentations

Practical Considerations For Selecting a Device

Finding a method to provide access to the computer for individuals with severe physical or sensory handicaps is not the problem. Selecting the appropriate technique that is practical, cost-efficient and effective becomes the major concern.

Practical Considerations for Selecting a Device (Continued)

Peripherals and adaptive devices need to be:

- easy to install
- easy to use
- easy to maintain
- reliable

Consider if the addition of peripheral capabilities will make the system prone to breakage.

Consider cost of the capability and how many students it may benefit.

Consider delivery time from the manufacturer especially if # device must be modified for # p#rticul#r student.

Consider the willingness of the manufacturer to continue supporting the peripheral through technical and user assistance.

Consider the documentation provided and time needed to train staff on the use of the hardware.

Consider standard versus non-standard components. Can they interface with other types of computers with the use of adaptors? Is custom designed software needed?

SIMULATING PHYSICAL IMPAIRMENTS AND COMPUTER ACCESS

To help teachers, parents, administrators and other educational personnel understand the problems and difficulties encountered by a handicapped individual trying to access the computer, it is possible to "simulate" certain conditions. Below are a few suggestions:

Visually Impaired

Using Apple Public Domain Disk #127 Hangman, play the game one time employing both the monitor and the Echo Speech Synthesizer. Play the game a second time BUT turn off the monitor, and make participants "listen" to the beeps that indicate the number of letters in the word. Play through the game until the word is guessed or you are 'hung'. Do NOT turn the monitor back on until the game is completed.

Discuss with participants the importance of speech output to a blind computer user. Emphasize the importance of developing skills in auditory discrimination, auditory perception and auditory memory. Blind users need to develop these skills as soon as possible in their education process.

Fine Motor Impairment

Provide participants with a copy of Handout ##E-7. Ask them to get out a sheet of lined paper and a pencil or pen. Read the instructions on the Handout orally. Emphasize the underlined words. THEN tell participants that they MUST complete the activity with their recessive hand. (i.e., if a participant is normally right-handed, they must use their left hand).

Variations

Have participants sit on one hand (preferrably their dominant hand) and use only one hand to complete the exercise.

Have participants sit on the edge of their chairs. Then, ask them to raise both of their feet about two inches off the ground. In this "unbalanced" position, ask them to write the exercise using their least dominant hand.

Have participants sit on both hands and put the pencil in their mouth to complete the exercise.

Place a time limit on the activity. Use a timer that has a loud clicking sound as each second passes. The sound will make participants conscious of the time limit. This tends to add stress to the exercise.

While participants are engaged in completing the written work, have one individual sit at a computer with a printer and using one finger or a pointing device or a switch attached to the Adaptive Firmware Card type and print the exercise.

Variations (Continued)

When the exercise is completed, discuss with participants the results. Try to incorporate into the discussion ideas such as:

-How did the participants "feel" while they were trying to write?

(Normally there are feelings of frustration, perhaps anxiety.)

-If you had to write every day, experiencing frustration and maybe even physical discomfort, what might begin to happen after a period of time?

(Frustration that there is no improvement, hate to write, give up, learned helplessness)

-Physically handicapped students are frequently 'excused' from writing, or have unrealistic expectations from teachers and parents.

-What happens Learning Disabled students who turn in 'sloppy papers'?

(Some get low grades in penmanship, may experience low self-esteem, may not do 'homework' or seatwork that involves writing, etc.)

-If a teacher is fairly certain that even continued practice will not result in improved penmanship, could word processing be an acceptable alternative?

(Touch on pros and cons: penmanship is a fine-motor exercise. Select standardized tests require a sample of penmanship. Students may produce more written work if they can use the 'easier' mode of word processing. With teacher assistance, students will more easily correct errors in spelling and grammar in word processing than by hand, etc.).

Hearing Impaired

Select a piece of software that gives the directions for usage through speech synthesis. Several programs from Laureate can be used. Play one menu selection using the sound so that participants understand how the software works. Turn off the sound using the Echo speech box volume control. Ask participants to evaluate the effect of using the software without speech synthesis. Was the sound motivational? Was it reinforcing? Would students benefit from that addition to the software?

Variations

Learn to give simple directions in sign language. Provide an incentive to participants. Suggest that you have some important directions to give them for a short activity. When the activity is completed, they can take a ten minute break. Then, give the directions in sign language.

Give directions to the participants by mouthing the words but emitting no sound.

Tell participants that you are going to give them some very important information and that notes should be taken. Then give the directions or information while facing a chalk board or bulletin board so that participants cannot see your lips. Speak very softly.

Discuss the feelings experienced by the participants during this exercise. Try to incorporate into the discussion ideas such as:

-How did the participants "feel" while they were trying to listen?

(Normally there are feelings of frustration or anxiety)

-How would vocabulary development be effected by hearing loss?

(A major factor contributing to poor academic skills among Hearing Impaired individuals is the lack of a broad vocabulary.)

SECTION B

INPUT/OUTPUT ACCESSIBILITY

Objective: To discuss various ways the input and output of a computer can be modified through software, adaptive hardware or by mechanically altering the internal keyboard to make it accessible to handicapped students

Time: 30-60 minutes

Materials: (Display those items that are available.)
Keyguard (also called a template)
Keyboard membrane (also called a safe skin) Adaptive Firmware Card
Color-coded keyboard
Raised keys
Sample touch tablets
Speech synthesizer
Voice Recognition
Light pen/Mouse/Joystick
Touch Screen
Braille Printer (or sample of printout)
Transparencies #B-1 through #B-7
Handouts #B-1 through #B-4e
Overhead
Zygo Switch Kit

Preparation:

1. Read through the "Notes for the Instructor" thoroughly. Pay particular attention to the seven (7) "Optional Activities." Select any "Optional Activities" that may be appropriate for the intended audience. Optional Activities 1, 4, 5, 6, 7 and 8 are recommended. Include these activities in the "procedure" section.

2. Prepare a sample keyboard on a computer that illustrates color-coding, raised keys and use of dot or animated stickers. (If the instructor does not have a computer available for this purpose, a separate "keyboard" can be purchased at Radio Shack for under $5.00.)

3. Prepare transparencies.

4. Select a sampling of adaptive devices. Select software that can be used to demonstrate the devices. A suggested list of software can be found in Section A.

5. Reproduce handouts and assemble in packets to give to participants.

Preparation:

6. Become familiar with the type of computer that will be available for the workshop. Read the "Notes for the Instructor" paying particular attention to the information about the specific brand of computer you will be using.

7. From the "Notes for the Instructor," select the particular activities that will be covered in the workshop. Following the information in the Notes, prepare the display of devices that will be appropriate for workshop participants.

Procedure:

1. Using transparencies #B-1 through #B-7, discuss with participants the definition of input and output and the common types of input and output devices used to access the computer.

2. Demonstrate the common modes of putting information into the computer and getting information out of the computer. Use Handouts #B-1 - #B-1e to discuss evaluating and purchasing hardware and adaptive peripheral devices.

3. Using the "Notes for the Instructor", discuss in general terms, the difficulty Physically Impaired students have with inputting information into the computer and Visually Impaired students have getting output from the computer. Thus the need for adaptations.

4. Using Transparency #B-5, discuss and demonstrate how the keyboard can be modified easily to assist the physically impaired student or the student who is easily distracted or confused by the QWERTY keyboard arrangement. Do "Optional Activity 1" with the group.

    a. keyguard
    b. membrane or safe skin
    c. color-coded keys
    d. raised keys
    e. Muppet keyboard

    Provide participants with a copy of Handouts #B-3 - #B-3a. Select Handouts #B-3b - #B-3c or #B-3d - #B-3e as appropriate.

5. Using Transparencies #B-3 and #B-4, discuss and demonstrate adaptive techniques available for the more physically involved students. Do "Optional Activity 3."

    a. direct selection
    b. scanning

Use the "Notes to the Instructor" for ideas on how to demonstrate these capabilities by using

a. switches
b. pointing devices
c. voice recognition

Do "Optional Activities 4, 5, and 6."

6. Using Transparencies #B-6 and #B-7, and the "Notes for the Instructor," discuss and demonstrate adaptive technology available for visually impaired students who require modification of computer output. Do "Optional Activity 7."

a. monitor
b. printer
c. speech synthesis

7. Provide participants with copies of the bibliography of producers and resources and the glossary of adaptive devices. Handouts #B-4 - #B-4e. Provide lab time for participants to use some of the alternate input/output devices and view the color-coded keyboard on display.

Resources: Appendices D, G, H, I, J, K, R, S, T, U, V and W

Applied Technology for Physically/Visually Impaired Students-Summer Institute, August 6-9, 1985, Merritt Island, FL. Florida Department of Education, Bureau of Education for Exceptional Students, 1985.

CAISH Final Report: Vol. I-III. Florida Department of Education.

CAISH Part 2: Training Package, Vol. I-III. Florida Department of Education.

Computer Awareness for ESE Parents. Instructional Technology Training Module 4. Florida Department of Education, Bureau of Education for Exceptional Students, 1986.

Computer Equipment and Aids for the Blind and Visually Impaired. Computer Center for the Visually Impaired, 1985.

Electronic Communication Devices for the Visually Impaired Part 2, Vol. III F. Florida Department of Education.

Personal Computers and the Disabled, Doubleday and Co., Inc., 1984.

Technology for Independent Living Sourcebook. Rehabilitation Engineering Society of North America, 1984.

NOTES FOR THE INSTRUCTOR

Input/Output Accessibility

The Instructor should read through all of the Notes for the instructor and then select from various options discussed, those that will be presented to the workshop participants. Some of the options involve technical knowledge of the inside of the Apple computer. These options can be discussed in general terms rather than actually performing the technical operation.

Handout #B-1 is a visual presentation of common input/output devices and can be used to introduce the different devices available. Handout #B-la entitled "Hardware Considerations" can be used by the Instructor to introduce this section on selecting computer adaptive devices for handicapped students.

Handout #B-lc - #B-le provides more detailed criteria information on the major parts of the computer including the Central Processing Unit (CPU), the keyboard, the monitor, peripherals and the printer.

Handout #B-2 - #B-2b is a bibliography of companies that produce or distribute adaptive devices for the computer.

Handout #B-3 - #B-3e provides general information on accessing the computer keyboard through color-coding techniques or the use of a keyboard template.

Handout #B-4 - #B-4e is an alphabetical listing of some of the major adaptive devices available for handicapped users. A brief explanation of each device is given.

Input Accessibility

The standard means used to input information into a computer is the keyboard. Most computer keyboards are identical to typewriters except they have the addition of special function keys. Special function keys normally have names such as BREAK, RESET, CONTROL, and CLEAR. The standard (typewriter) keyboard is called the QWERTY keyboard (Note the top row of letters on a typewriter or computer spell Q-W-E-R-T-Y if you begin with the top left letter.) Some computers also have the addition of a lO-key calculator pad which is normally located to the right of the regular keys. Some computers have special function keys for saving, loading, or running a program (e.g., IBM PC).

The feel or action of a keyboard is an important consideration. Keyboards vary in sensitivity to the touch. They also have different shape and size keys depending on the model. Some people develop a preference for certain keyboards because of their feel.

The standard keyboard can be used by most exceptional students. Whenever possible, the standard keyboard SHOULD be used because it remains the most efficient way of interacting with a computer.

OPTIONAL ACTIVITY 1

Show participants keyboards from more than one type of computer if they are available. Have one participant type on each keyboard. (The computer does not have to be turned on for this exercise). Ask the participant to describe the similarities and differences of the two keyboards. Points they may want to.compare include:

a) the feel of the keyboard
b) the arrangement of special function keys
c) the different names used for function keys

Protective Membrane

Several adaptations to the standard keyboard are available to assist students with specific needs. The first is a protective membrane which covers the keyboard and protects it from liquid. This protection allows use of the keyboard by students who have drooling problems. The protective membrane does require more pressure to activate the keys which msy make it difficult for some students to use. On the other hand, some users will find that the added pressure required to activate the keys helps control accidental input. If a keyboard membrane is not available to show participants. the presenter may remind participants of fast-food restaurant cash registers such as McDonald's or Burger King. The cash registers have a membrane cover on them.

Keyboard Template

The second adaptation for a standard keyboard is a template that can be custom designed to restrict sccess and limit stimuli. The template allows students who have uncontrolled random motions to rest their hands on the keyboard without unintentionally activating keys. Templates can be custom designed to allow access to an entire keyboard or to just a few select keys. Custom designed templates can be useful not only for physically handicapped students but also for students who are easily distracted or confused by the QWERTY arrangement of the keyboard. A custom template must be designed to match the key strokes required by a specific piece of software.

If a commercial template is not available for the workshop, use Handouts #B-3 B-3a. Handout #B-3 is a diagram of an Apple Keyboard. Handout #B-3a is a diagram of a template that fits over the keyboard. Select circles on the sample template can be cut out to demonstrate the concept of a custom-designed template.

Color-Coding the Keyboard

A third adaptation of the keyboard involves color-coding. Various techniques can be used to achieve color-coding. If a computer has multi-classroom users (e.g., a lab setting) each teacher should be informed of the purpose and technique used to color-code. Students also need to understand the purpose and the meaning of the coding. Color-coding techniques include:

1. painting selected keys with permanent oil or acrylic paints
2. using colored dots to place over selected keys

   (Note: It is better to use small dots that do not cover the letter or symbol.)

3. using animal or plant stickers on select keys
4. purchasing a "keyboard" (available at Radio Shack Electronic Stores) Remove the keys from the new keyboard and place them on top of selected computer keys. This will raise select computer keys to make them more noticeable. Raised keys can also have stickers or paint if desired.

The keys that are selected for highlighting or color-coding will vary according to the needs of the student and the software in use. Common keys selected for this treatment may include:

1. RETURN or ENTER key (used frequently to advance the screen or register an answer provided by the user)
2. A B C D if the software asks for multiple choice answers
3. Y and N if the software asks for Yes or No answers
4. SPACE BAR used frequently in software or word processing
5. SHIFT KEY used for capital letters
6 CAPS LOCK KEY (Apple only) required to be in the down position to operate many Apple software programs.

To demonstrate the different techniques for color-coding, the workshop presenter may select to use one computer keyboard that has samples of each technique or the presenter can purchase a keyboard from Radio Shack (under $5.00) that can be used for the purpose of demonstration.

Disabling Auto Repeat

When you hold down a key on a computer keyboard for more than about a half-second, it will start repeating. For some exceptional students this can be a problem.

The Auto Repeat function on computers frequently causes problems for students who do not have good fine-motor coordination. Computers require users to make a fast, clean hit on each key to input information into the computer from the keyboard.

Disabling Auto Repeat (Continued)

The presenter may wish to simply discuss the auto repeat function of the computer and to demonstrate this feature by loading a word processing program into the computer and holding down any key for several seconds. The key (example: the letter "m") will repeat across the screen.

A more technical demonstration can include directions for disabling the auto repeat function. It is important that the instructor be familiar with the computer model. Older computers require modifications within the hardware. For example, the Apple IIe has a ROM integrated chip (IC) that controls the delay and repeat functions. Pin 5 of the ROM IC must be bent so that it remains outside the socket to inactivate the auto repeat function.

The Apple IIGS allows the auto repeat function to be controlled from the control panel of the computer. The control panel is accessed by holding down the CONTROL-OPEN APPLE and ESCAPE key simultaneously. The control panel main menu lists a number of choices including OPTIONS. Select OPTIONS and a second menu appears. The REPEAT SPEED and REPEAT DELAY can be adjusted from this menu.

Resets Without the Control Key

There are many times when a computer user has to use several keys simultaneously to complete an operation. For some exceptional students, this makes access impossible. The most common multi-key operation is to warm-start or reboot the computer. The IBM PCjr. reboots by pressing the control, alternate and delete keys simultaneously. The keys are labeled Ctrl, Del and Alt on the keyboard. The TRS80 Model III resets with one key, the orange reset button.

To reset (warm-start) an Apple IIe you must press both the Control and Reset keys. And to reboot (force coldstart) you must press the Control, Reset, and Open Apple keys simultaneously. Requiring the user to press multiple keys is done to reduce the chance of an accidental reset. Software does exist for most computer models that will assign multi-key function values to one key. The presenter may choose to discuss the theory of this process or may have a piece of software available to demonstrate.

For those who have difficulty doing this or just want to simplify things, Apple has provided a means to change this so that the Control key does not have to be used. In other words, you can just press the Reset key to reset, or both Open Apple and Reset keys to reboot.

OPTIONAL ACTIVITY 2

To do this, you'll need to remove the Apple IIe case to get to the underside of the keyboard. By the Reset key you will see two jumper pads, one open and one closed. You need to cut open the closed jumper pad with a knife, and close the open jumper pad by bridging the small gap with a drop of solder.

Keep in mind that this modification greatly increases the chance of an accidental reset by the user which many programs will not tolerate. You can replace normal keys with alternate action keys (like the CAPS LOCK key). The Contol and Open Apple keys in this configuration will allow single-finger keyboard access.

Enlarged Keyboards

Another adaptation of the standard keyboard relates to the key size or individual points with which a person must make contact to input information into the computer. For students with limited fine-motor skills, an enlarged keyboard can be an alternative. A Muppet Keyboard and the Unicorn Keyboard are examples of enlarged keyboards. The PowerPad can also be programmed to serve as an enlarged communication keyboard. (See Section H for more information on touch sensitive tablets including enlarged keyboard.)

The Muppet keyboard is a colorful, plastic board with a cord that plugs into the "game port" on the back of the Apple computers. The keys are arranged in alphabetical order. The Muppet keyboard is software specific which means it only operates with software programmed to accept its input. (If possible, show participants the Muppet keyboard.)

Expanded keyboards such as the Unicorn Keyboard work with the Adaptive Firmware Card. It can be mounted on a wheel chair and programmed to accept delayed input. A student can rest his hands on the keyboard until he finds the correct key and then press it for the computer to accept the response. Expanded keyboards can have different overlays to fit the needs of the students. A QWERTY overlay is available that has large contact points or customized overlays can be programmed for the user. (If possible, show participants an Expanded keyboard.)

The Power Pad is a large touch sensitive surface. The cord plugs into the 16-pin port inside the Apple. With specific software, the Power Pad can be programmed to interface with the Echo speech synthesizer. Its surface can be divided into different size contact points. (If possible, show participants the Power Pad.)

In selecting a larger keyboard for an individual, there are several factors to consider. It is important to evaluate the range of motion needed to reach the contact points. It is also important to consider how the individual can best position the keyboard. Should it be mounted on a wheelchair? Can it be held by the individual? Can it be set up on a lap tray without being bumped or jerked on the floor? All of these decisions need to be made by a team which includes an occupational therapist and/or a physical therapist.

Very Physically Involved Students

For the very physically involved student, the problem of accessing the computer may be extremely complex. As a result, a wide variety of approaches exist, to match not only the varying needs and disabilities, but also the varying residual control that these students may have.

Selecting a specialized adaptation for a physically involved student requires an evaluation of the student's capabilities in a number of areas. During the evaluation, the current, as well as future, physical status of the person should be analyzed. An individual student may begin at one level of computer access with a future goal of developing skill in a faster technique.

It is recommended that a "team" approach be used to evaluate a student who needs specialized consideration for computer access. The teacher, Occupational Therapist, Physical Therapist, Speech teacher, Instructional Technologist and other appropriate staff should give a "holistic" evaluation of the student.

A student evaluation should include the following considerations:

All actions over which the person has voluntary and consistent control

Functional range of motion

Accuracy and timing ability

Strength or force a person can generate to activate a device

[Section A of this Module provides a sample criteria for student evaluation for adaptive devices and a draft observation form. (See Handouts #A-4 - #A-4e.)] During the evaluation, both direct selection and scanning techniques should be tried with the student to see which is more appropriate and comfortable for the user.

Direct selection is any technique where the individual directly points to the various choices presented by the computer program. Using the computer keyboard is the easiest way to have direct selection. The mouse and joystick are other examples.

Direct selection techniques take a wide variety of forms. These techniques may take advantage of whatever body part the individual has best control of including finger, hand, arm, leg, knee, foot, head or eye. A fairly new direct selection technique (i.e., pointing technique) is the use of optical pointers which make use of a beam of light. This approach has the advantage that the "length" of the beam automatically adjusts to the distance necessary to reach the item being indicated. This results in the individual's having to exert less physical control and also allows the individual to stay in a more stable position, rather than having to lean in one direction or another in order to reach his choice, as he would with a mechanical pointer.

When an individual has erratic or involuntary jerking motions, a technique called "auto-monitoring technique" can be used. This approach has an averaging effect which allows an individual to point, even shakily, to an item, and have the system determine which item he is trying to indicate. Even if the individual makes brief excursions onto wrong selections, the system can ignore these false signals and pick out the desired target of the individual's pointing.

(Examples: Expanded Keyboards, Remote Keyboards, Express I, Lighttalker, Koala Pad, Power Pad.)

Scanning is used whenever the student is unable to point for himself. Items are presented sequentially. When the desired item is reached, the student signals by activating some type of switch. Since the scanning approach is much slower and more cumbersome, it is used only in situations where direct selection is not possible.

To use the scanning technique, a student need only have some consistent motion of his body which he can control. This can be the movement of any part of his body, or the cessation of movement.

If the number of choices is large, the scanning technique will be slow and cumbersome. If a student must spell out information, for example, it can take a very long time to scan through the alphabet picking out each letter individually.

OPTIONAL ACTIVITY 3

The presenter can demonstrate scanning if a Caffelle Model 100 ($30.00) or an Adaptive Firmware Card ($400.00) is installed in an Apple IIe computer. The University of Washington Academics -Math with Scanning diskette can be used for demonstration purposes.

One of the primary reasons for the extreme length of time required to transfer information using the scanning approach is the fact that the bulk of the time is spent displaying the "wrong" choices. In order to accelerate the scanning process, several techniques have been developed to reduce the number of wrong choices which are presented. These include:

Group-item

Frequency

Very Physically Involved Students (Continued)

Group-item scanning presents groups of items to the student until he gives a signal indicating that his desired item is in that group. The individual items within that group are then scanned individually until the desired item is reached. The most popular forms of group-item scanning are either row-column or page-item scanning.

Items can also be presented in their frequency of use. This technique should be implemented with care since it is sometimes more confusing to have the selection order change each time.

(Examples: Adaptive Firmware Card, Express I, Lighttalker, Zygo Model 100 Communication System, Zygo Switches.)

Input Devices

There are three groups of input devices that provide either direct selection or scanning capability to handicapped students. These groups include

Switches

Video pointing

Voice recognition

Switches have been used in some exceptional student education classrooms to control battery-operated toys. This gives the student a degree of control over his environment that is not otherwise possible. Switches used in this manner reinforce the concept of cause and effect. When the student touches the switch, the toy moves.

OPTIONAL ACTIVITY 4

If the presenter has a switch - controlled, battery-operated toy, they may wish to demonstrate it while discussing this concept. The Zygo Sample Switch Kit is available at FDLRS Centers and can be used to demonstrate or display a variety of switches.

The switches used with toys can also be used as input devices for microcomputers when at least one of three conditions is met:

1. Commercially prepared software has been programmed to accept switch input.

2. Public domain software has been programmed to accept switch input.

3. Some devices such as an Adaptive Firmware Card allow switch input for all software.

Very Physically Involved Students (Continued)

The first two conditions for using switches with microcomputers involve the selection of specific software or reprogramming software to accept signals from switches.

The third condition involves the purchase of the device. The Adaptive Firmware Card is designed to provide transparent access to the Apple II series of computers for people who need an alternative to the standard keyboard.

Transparent access means the switch will be able to replace the usual keyboard for input without interfering with normal operations of a program. Therefore, commercial software will not need to be reprogrammed to accept switch signals.

There are several hundred switches that can be used with handicapped students. In selecting the appropriate switch for an individual, the following guidelines should be followed:

1. Switches should be safe, reliable, sturdy, and simple to use.

2. They should require minimum effort while maintaining maximum comfort for the user.

3. The selected switch should be easy to disassemble for cleaning and maintenance and it should be constructed of standard components for increased availability and ease of repair and replacement.

4. Most importantly, a switch must be selected that a student can move voluntarily and confidently using motor strengths that will be the least tiring. That motor strength could be head movement, an elbow or foot movement or eye blinking.

5. Particular care should be taken that the selected switch does not cause an associated involuntary physical reaction in the student. Consultation with an Occupational Therapist and/or Physical Therapist is recommended.

OPTIONAL ACTIVITY 5

There is a wide variety of switches available that can be activated by different parts of the body. If examples of the switches are available, the presenter can show or demonstrate them to the group.

A toggle switch can be located to suit the needs of the individual. The switch is placed where the individual has consistent body movements.

Switches require varying degrees of pressure and are selected to minimize exhaustion in the user. The air cushion switch can be held in the hand or placed on a desk where pressure can be applied.

For individuals with limited arm and leg movement, a brow wrinkle switch may be an option. The brow wrinkle switch is activated by raising and lowering the eyebrows.

Another alternative is the mercury switch which is activated by tilting a body part a specified number of degrees.

Video Pointing Devices

The second group of input devices can be called video pointing devices. This group includes: joysticks, light pens, mouse, digitizing tablets, touch tablets and touch screens. These devices allow the student to use linear movement to move the cursor on the screen. But the devices vary considerably in the ease of the input process and the amount of motor-coordination needed to successfully operate them.

The mouse and the joystick require the user to manipulate them in the appropriate direction and in the proper proportion to the screen in order to place the cursor at a specified location on the screen. Then, a button must be pushed to indicate one's selection of a location. This requires good visual-motor coordination. (If possible, show participants a mouse and joystick.)

A finger or any blunt instrument can be used to indicate a choice on the screen when using a touch tablet. A larger touch pad may be helpful for those without fine-motor skills.

Many of the video pointing devices have been made popular by the computer home market. Joysticks are used with many computer video games. Touch tablets are available in many toy stores with software that allows the user to create pictures or music.

The mouse is used with several computers to allow easy entry of data in word processing and electronic spreadsheet software programs.

Another alternative to the keyboard is to interface a communication board with a computer. The Lighttalker is an example of one communication board that can be interfaced with an Apple computer. For students who have no fine-motor skills, the communication board interfaced with a computer, becomes a means of dramatically expanding their potential for learning and communicating. If a student has been trained to use an electronic communication board, it is easier for him to continue to use the same system to interact with a computer as opposed to learning a second input-access procedure.

Voice Recognition

The third input group that has been developed for computers is voice recognition. Human voice or other sound sequences can be interpreted by the computer as regular input. This requires the user to train the system to understand voice command. The system stores the digitized voice print of the user during the training session. Then, during normal use, the computer matches the voice input to the recorded voice prints to determine what is input.

For example, the sound "ugh" can be given when the computer displays the word "run" during the training. Now, whenever the sound "ugh" is made, the computer performs the run function.

The current technology uses voice prints, which makes it possible for only one person at a time to train the computer for voice command. It is expected that multiple voice recognition will be available soon.

OPTIONAL ACTIVITY 6

The Introvoice System is available at FDLRS Centers and can be used to demonstrate voice recognition technology. The presenter should read the Introvoice manual and practice using the System because it is a more complex technology. During the workshop, the presenter may demonstrate the technology to participants; or may have the participants practice training the computer to their voice patterns.

Output Accessibility

The standard output devices for a computer are the printer and the video screen and speech synthesis.

Video Screen

The video screen is also called a monitor, cathode ray tube (CRT) or Red-Green-Blue Monitor (RGB monitor).

The video screen normally displays text and graphics or pictures using tiny dots of light referred to as pixels. The size of the dots determines the sharpness of the display. A high resolution screen has very small pixels and a very clear, sharp display.

Whenever a CRT is being used it is important to position the video screen away from direct sunlight and indoor lighting to avoid glare. Some screens can be tilted to help eliminate glare.

It is also important to position the CRT at a height that is comfortable for the user and to adjust the screen brightness to the lowest level that is comfortable for the user.

The screen contrast should also be adjusted to prevent a fuzzy picture.

OPTIONAL ACTIVITY 7

> The Instructor may choose to demonstrate the effect of the contrast, brightness, vertical and horizontal controls on a screen displaying a program. Have participants compare these knobs to similar controls found on a home television screen.

Many Visually Impaired students can use the standard video screen. Students should be tested to determine whether they can use the standard CRT, or whether they need enlarged displays which can be obtained by using a wider screen monitor or by using a magnifying glass.

For low vision students for whom simple enlargement is insufficient, one of the enlarged graphic displays that are available commercially may be useful. These include screens that can produce letters up to 5" tall. Another option is the use of an amber monitor, which provides optimum color output for the low-vision student.

A completely blind student may choose to use the Optacon to scan text directly from the video screen or printed documentation that accompanies software.

Output Accessibility (Continued)

Printer

The second standard output device is the printer which produces hardcopy. There are two basic types of printers: the dot matrix and the solid impact printer. The dot matrix forms characters from tiny dots, while solid impact printers produce output that looks as if it were printed by a typewriter.

For Visually Impaired students who cannot read standard text, printers are available which produce standard braille.

Speech Synthesis

A third type of output device is voice or audible signal, referred to as a speech synthesizer.

Speech synthesis can be used as an inexpensive alternative to print or video output by visually impaired and blind students. It is also an option for nonreading students, or for students who learn better through an auditory mode.

Voice synthesized speech tends to be mechanical sounding at this time, but the technology is rapidly improving the voice output quality.

Like other adaptive devices for the computer, voice or speech synthesis requires specific software that has been programmed to produce speech output.

In addition, specific devices must be purchased for most computers. This normally includes a board to plug into the computer and a speaker box that may be located inside the computer or placed alongside it. Manufacturers are beginning to include speech synthesis as an integral part of the hardware.

SECTION C

SPEECH SYNTHESIS

Objective: To discuss and demonstrate the use of speech output as it applies to the use of computers in the instruction of handicapped students

Time: 15-60 minutes, depending on activities selected

Materials: Apple Computer (minimum). Additional computers are required for hands-on activities
ECHO speech synthesizer
Handouts #C-1 through #C-4
Talking Writer software
Hangman public domain software
*If another model computer is used, select appropriate software.

Preparation:

1. Read through the "Notes for the Instructor" to become thoroughly familiar with the two major types of computer speech output.

2. Select the combination of options to be used:

   a. demonstration of speech output only
   b. hands-on experience with software using speech output
   c. demonstration of ECHO installation procedure
   d. hands-on practice of installing an integrated circuit board

3. Read through the handouts and select those that are appropriate for the intended audience.

4. Make copies of handouts for each participant.

5. Select a sampling of software that uses the speech synthesizer. If the hands-on option is chosen, become familiar with the software. Prepare backup copies of the Hangman Apple public domain disk to use during lab time.

6. Prepare a display of software that operates on an ECHO and Apple. Titles available at all FDLRS Centers include Hangman and Texttalker.

Procedure:

1. Demonstrate the ECHO speech synthesizer with selected computer-assisted instruction software. Use the Apple public domain program Hangman.

Procedures: During the demonstration, turn off the monitor to let participants 'feel' what a blind student experiences.

2. Demonstrate the parts of the ECHO including voice box and interface card. Explain how the ECHO interface card is placed in slot 4 (default slot) of the Apple IIe.

   Variation: Have participants practice installing the ECHO into slot 4 of an Apple IIe.

3. Have participants boot up software that uses the ECHO Speech synthesizer during lab time. Using the ECHO disk and manual, have participants practice typing in the words on Handout #C-3.

4. Referring to Handout #C-1, discuss the use of speech output with handicapped students. Discuss the eight questions listed on the handout which identify some criteria to consider when purchasing a speech synthesizer.

5. Referring to the "Notes for the Instructor," explain to participants why the ECHO Speech Synthesizer used with the Apple is most often selected for education. Provide participants with a copy of Handout #C-2 - #C-2a which provides a list of additional hardware.

6. Provide participants with a copy of handout #C-4 - #C-4h and discuss the importance of having software available to use any adaptive device effectively in education.

7. Referring to the "Notes for the Instructor," discuss the handicapped students who would benefit most from the use of speech synthesis.

Resources: Appendices C, G, H, K, N, R, S, T, U, V and W

Burkhart, Linda. Using Computers and Speech Synthesis to Facilitate Communicative Interaction with Young and or Severely Handicapped Children, Linda J. Buckhart, 1987.

CRC Monitor. Computer Resource Center, Florida School for the Blind.

Mach, Cathy. Microcomputer News for Teachers of Blind Students. A Quarterly Publication. Computer Resource Center, Florida School for the Blind.

Owner's manual for ECHO II Speech Synthesizer.

NOTES FOR THE INSTRUCTOR

Introduction

This section can be used as a separate workshop in which participants are introduced to speech output and then spend time in a lab setting using software programmed with this capability, or this section can be combined with any number of additional sections B - G in Module 5 that provide more information on selected adaptive devices.

Whether the Instructor intends to demonstrate speech output or provide hands-on experience in a lab setting, it is important to have the proper hardware and software available for the workshop.

The speech synthesizer that is used most in Exceptional Student Education is the ECHO II. Most teachers prefer the model that has an external speaker box with volume control and earphone jack. The ECHO II is popular because it is relatively inexpensive and because there is a wide range of educational software available. The ECHO II is used most often with the Apple II series of computers though versions are available for other brands of computers. At this time the most commercial and educational software on the market is for the ECHO and Apple II series of computers interfaced together.

Handout #C-1 introduces workshop participants to speech output in general and provides a set of questions that can serve as a guide to buying speech output for a school.

Handout #C-2 - #C-2a is a resource list of some of the companies that provide speech synthesizers.

Handout #C-3 is a list of sample words that have been spelled phonetically so that the ECHO speech synthesizer can pronounce them correctly. The Instructor may provide this handout to participants for discussion or it can be used as an exercise in a lab setting using the ECHO disk and the directions "TRY IT OUT" found in the ECHO manual. Handout #C-4 - #C-4i is a bibliography of some software that runs on the ECHO and Apple.

In addition to demonstrating speech output and/or providing hands-on lab time for participants, the Instructor may elect to demonstrate the installation procedure of an ECHO integrated circuit card into a slot in the back of the Apple. Detailed directions for this procedure are in the ECHO Manual.

The Instructor should emphasize to workshop participants the importance of reading the ECHO manual and having it available for ready-reference.

Speech Synthesis

Alternative speech devices are available in several forms which can be quite helpful for students with speech or voice-related handicaps. Speech produced by the microcomputer and its associated peripheral devices can improve the input alternatives for:

1. Students with visual impairments
2. Students with reading disorders
3. Students who need an auditory component for learning

Several alternatives are available for producing voice output with a computer, each of which has both advantages and disadvantages. Three major options are:

1. Audio cassette tapes
2. Speech synthesizers
3. Speech digitizers

One example of a cassette tape program is the Cassette Control Device (CCD). Available from Hartley Software, the CCD integrates with an Apple IIe or Apple IIc computer. It is an electronic device that allows the computer to activate a standard cassette tape recorder by using a remote control jack (REM) and an internal microphone. The teacher can record vocabulary words, directions and definitions on a cassette tape which is controlled by software programmed to interact with the CCD. The CCD plugs into the game port of the Apple IIe and the computer synchronizes the tape with the presentation on the screen.

Synthesized Speech is the production of speech by the microprocessor by passing a series of letters or words through a pre-established set of pronunciation rules. Voice output quality is based on the degree to which the rules used are the same as those actually heard in speech, the quality of the sound chip and the speaker box. Synthesized speech is produced only a letter or a word at a time, making connected discourse sound more artificial. However, an unlimited vocabulary is possible with a speech synthesizer. Refer to Handout #C-3 on the phonetic spelling of words for proper pronunciation by a speech synthesizer.

Advantages of using synthesized speech are that the vocabulary to be used is virtually unlimited, storage of text to be spoken is relatively efficient (a lot can be put on a disk), and synthesizers tend to be fairly easy for teachers to learn to use. Some speech synthesizers come with programs which students can use for immediate feedback on what they have typed on the keyboard, making them good tools for the visually impaired.

Among the disadvantages of speech synthesizers are the relative quality of the voice output (worse than both audio cassette and digitized speech) and the fact that so far connected discourse has been difficult to produce. Output is in the form of individual words.

Speech Synthesis (Continued)

Digitized Speech involves the coding of prerecorded speech into a series of di8its which can be "read" by a decoding card and translated into sounds which approximate the human voice. The process of digitizing is out of the realm of most teachers' capabilities, although banks of prepared words and phrases are commercially available on software from which the teacher can construct passages for use by students. The sound quality of digitized speech tends to be better than synthesized speech. At this time a special decoder card is needed to reproduce digitized speech, along with a speaker, since the output is similar to natural speech. However, it is difficult for teachers to develop programs with this type of voice output and a lot of disk space is required for the speech codes. The vocabulary which a teacher can use to develop his or her own programs for students is limited to the banks which have been commercially prepared.

Uses of Synthesized Speech with the Handicspped

Visually impaired students, or those having learning or reading disabilities, can benefit from having a speech synthesizer attached to the computer. The speech synthesizer enables a blind student to hear output from the computer, and to use many of the programs used by his classmates. The computer can be used as a word processor, as well as a written communication aid for the visually impaired.

Students who are unable to read written instructions on the screen can also use a computer if instructions are given with the aid of a speech synthesizer. Poor readers, or children with visual processing problems, can also be helped by hearing the information on the screen as they see it.

Special software is needed to activate the speech synthesizer. Companies that produce the synthesizers also write software to be used with it. Many software publishing companies are beginning to write software to be used with synthesizers.

SECTION D

TOUCH SENSITIVE TABLETS

Objective: To introduce and demonstrate the use of various touch sensitive tablets and their potential use with handicapped learners

Time: 30-60 minutes

Materials: (List will vary according to availability of different brand names.)
Handouts #D-1 - #D-5g
Koala Pad
Muppet Keyboard
Power Pad
Touch Window
Unicorn Keyboard or other Expanded keyboard (Use with Adaptive Firmware Card.)

Preparation:

1. Read through the "Notes for the Instructor." Select which touch sensitive tablets will be discussed and demonstrated at the workshop.

2. Determine if the workshop will be exclusively on touch sensitive tablets or if this topic will be combined with other selected adaptive devices included in Sections B-G of Module 5.

3. Make copies of the handouts that pertain to the touch tablets that will be used in the workshop. Have a copy of each handout for all the participants.

   # D-2 Muppet Keyboard
   # D-3 Power Pad
   # D-4 Touch Window
   # D-5 Unicorn Keyboard

4. Have a sample of the selected touch tablets and compatible software available for the workshop. If samples of all the devices are not available, have pictures to provide a visual representation. Catalogs often provide good illustrations of devices or the packaging box of some devices gives an excellent visual representation (example: Muppet Keyboard).

5. The Instructor needs to take time before the workshop to be familiar with at least the minimal operating procedure of each touch sensitive tablet to be demonstrated. It is

Preparation: important to read the Owner's Manual for each device, to practice installation procedures and to practice using software with the device.

Some touch sensitive tablets such as the Muppet Keyboard are very easy to install and use. The Power Pad and Unicorn however, have more intricate installation procedures and use requirements.

6. Determine if the selected touch sensitive tablets are going to be displayed, demonstrated or discussed and to what extent. Refer to the Owner's Manual and "Notes for the Instructor" before making a decision. The time allotted for this workshop will vary considerably depending on how detailed the presentation is.

Procedure:

1. Display several different touch sensitive tablets. Compare and contrast the following:

   a) Contact surface size and design
   b) Connector cord, plug and/or interface card to computer
   c) Cost of different devices
   d) Ability to inter#ace with other devices such as the Echo
   e) Availability of programmed software
   f) Availability of authorizing software that can be easily programmed to meet individual student needs.

2. Disseminate selected Handouts on each device to workshop participants. Refer to the Handouts as each device is demonstrated.
   #D-2 Muppet Keyboard
   #D-3 Power Pad
   #D-4 Touch Window
   #D-5 Unicorn Keyboard

3. As each device is demonstrated, lead a discussion on how the device can be integrated into the curriculum of handicapped students.

4. Refer to and display the Owner's Manual for each touch sensitive tablet demonstrated. Emphasize the importance of reading the Owner's Manual and having it available for ready reference.

5. Discuss the fact that some touch sensitive tablets such as the Power Pad and Unicorn have tremendous versatility in Exceptional Student Education because they have software that lets their contact surface be programmed to meet the needs of the user.

Procedure:

6. Discuss the fact that some touch sensitive tablets have software that lets them integrate with other devices such as the Echo Speech Synthesizer. Integrating the Echo and touch pad, some software can be programmed as an augmentative communication board.

If the software that controls this capability is not available, the instructor can still demonstrate the process to participants. Use Handout #D-1, a sample communication overlay for the Power Pad or Unicorn, and touch one of the symbols or words displayed on the overlay. Explain that, with the correct software, that touch will cause output to be displayed on the monitor and through the speech synthesizer. Complete the activity identified in the directions on Handout #D-1.

Resources: Appendices C, E, G, H, K, M, 0, R and S

Closing the Gap

Owner's Manual for each device

NOTES FOR THE INSTRUCTOR

Touch Sensitive Tablets

This section of Module 5 is designed to introduce workshop participants to one or more Touch Sensitive Tablets. Each of the suggested devices varies in capability and some of them include complex features that may require skills in programming. This is particularly true of the Power Pad and the Unicorn. This section of Module 5 does not address the more complex features of the various Touch Sensitive Tablets.

There is an ever-increasing, wide range of touch sensitive tablets for the microcomputer. Each varies in its surface, size and design and in the manner in which it is connected to the computer. The software is normally "device-specific," and it is the software that gives the user different capabilities.

The Koala Pad and Power Pad have similar designs and purposes but are very different in size. This is an important consideration for students with limited range of motion. (Refer to Handouts #D-l through #D-la and #D-3 through #D-3h.)

Recently new software has been developed for the Power Pad that gives it the ability to function as a communication board using the Echo Speech Synthesizer and monitor as output. Some of the communication software packages allow the development of customized vocabulary for users. (Refer to Handouts #D-3 through #D-3h.)

The Muppet Keyboard is colorful and durable. The numbers and letters are arranged sequentially which is advantageous for students working on letter and number recognition. Some of the Muppet Keyboard software can also run on the Touch Window. (Refer to Handouts #D-2 through #D-2c and Handouts #D-4 through #D-4e.)

The Touch Window has versatility because it can be used in three ways: as a touch sensitive screen, as a graphics tablet and as an overlay to give animation to a book. In each case specific software must control the device.

Software for both the Power Pad and Unicorn Keyboard allows the devices to interface with the Echo Speech Synthesizer. Therefore, both devices can be used as communication boards. The Power Pad however, has a portable counterpart that can be independent of the computer.

The Unicorn Keyboard requires the Adaptive Firmware Card to be plugged into the Apple IIe computer. The interface of these two devices provides powerful options to the user including an enlarged QWERTY keyboard or customized touch points to meet the needs of the user.

The capability and limitation of each device should be taken into consideration along with the needs of the user before purchase of a device is finalized. Information related to calls of touch sensitive tablets follows.

Muppet Keyboard

The Muppet Learning Keys is a hardware/software package consisting of an alternative keyboard, one disk and an instruction book. The lightweight, brightly colored keyboard plugs into the computer. The computer keyboard is bypassed and children use only the large Muppet board. Helped along by Kermit, Miss Piggy and other members of the Muppet gang, children learn about numbers, colors, letters and symbols. Both the keyboards and software are extremely well-designed.

There are three activities on the demo disk--a Letters game, a Numbers game and a Discovery mode. The Discovery mode allows children to explore the keyboard and its various options. Something interesting happens each time a key is hit. Press an alphabet key and a letter appears on the screen accompanied by an appealing character whose name begins with that letter. Press Go and the character begins to move and make sounds. The dragon spits fire, the kite waves in the wind and plays music, and the jack-in-the-box springs in and out to the tune of "Pop Goes the Weasel."

Press a number key and that number of pictures appear on the screen. Press a color key and the figures change color. Press other keys and watch arrows move across the screen in the direction selected (up, down, left, right).

The "oops" key takes users back one screen. An eraser key clears the screen and a zap key returns users to the main menu.

The Letters and Numbers games are similar. In the Numbers game, 1-9 pictures of the same object appear on the screen. The child selects the corresponding number symbol. If the selection is right, the pictures will move and music will play. A buzzing sound indicates a wrong answer. Children can press the help key to see the correct answer. The Letters game has basically the same format except that children are shown a letter and are asked to match the corresponding letter.

The seamless keyboard is sturdy and well-designed. The "keys" are large, pressure-sensitive, slightly raised squares on a brightly decorated, vinyl surface. The keys are arranged in alphabetical order. They are easy to find and use. The keyboard area is backed and framed in hard plastic.

The Muppet Keyboard was designed for preschoolers-kindergarteners but it will also appeal to older children. First-third grade L.D. and children who need to develop basic letter and number concepts can make good use of this program. With a little imagination it can be used to enhance vocabulary development and beginning reading skills, visual and auditory memory, sequencing skills, audience comprehension and speed of perception and response.

Problems with the Muppet Keyboard

On the Apple version, the colors red and orange are not clearly distinguishable from the color yellow. Sunburst says this is a problem with the Apple hardware rather than a programming problem. They say these same colors are intense and true on the Commodore and IBM. If you have an Apple, point out the color discrepancies to the children. Show them examples of true red, yellow and orange and compare them with the colors on the screen. Avoid using red and orange as much as possible.

Some of the pictures are indistinct and lack detail. The pictures in the manual and poster are more detailed and quite clear. Use them to help children note the distinguishing features of each object and to help them more easily recognize the computer version of the pictures. You may want to show children as many of the actual objects as possible.

Handouts #D-2 - #D-2a give suggestions for using the Muppet Keyboard in the curriculum. Handouts #D-2b and #D-2c lists available software.

Adapted from an article "Muppet Learning Keys," by Miriam Furst, published in the April/May 1986 edition of Closing the Gap.

PowerPad

The PowerPad is a touch-sensitive device which allows special individuals to gain access to a computer without the hardships, limitations and frustration associated with keyboards. (Handouts #D-3 - #D-3h) Features of the PowerPad, which is also marketed in Canada as the WonderWorker Tablet, include:

1. A 12" x 12" working surface area which operates through multiple contact points inside the pad

2. A variety of overlays for the touch-sensitive surface, which when coupled with their accompanying software, turn the device into a game board, a learning center, a multicolored canvas, and much more

3. Durable, plastic shell construction which allows for tough use by children

4. Software and cable connections for the Apple series, IBM-PC, Commodore 64, and Atari 400/800

Since the PowerPad operates by direct hand contact with the pad surface, it allows students who have difficulty using the keyboard to access the computer. As a result, this device which was originally designed to help young children prepare for reading, is now being used extensively with exceptional students.

PowerPad (Continued)

Much of the software which was originally developed as readiness material for young children is now used to reinforce skills for exceptional students or to meet their needs in more innovative ways.

Specialized software has been developed which allows the PowerPad to function as a simple communication board for nonverbal students. There is even a portable, specially adapted PowerPad which has a built-in speech synthesizer and on-board microprocessor.

Touch Window

The Touch Window, available from Sunburst, attaches easily to a computer monitor with velcro-type strips to convert the computer into a touch screen. It plugs into the joystick port on the back of the Apple. It can also be used as an 8 1/2" x 11" graphic tablet to create colorful graphics by drawing, tracing or painting with a special pen. A third use of the Touch Window requires an Interactive Book that operates with specific software. There are a limited number of programs that operate with the Touch Window. They are available from Sunburst and the Handicapped Children's Computer Cooperative Project (HCCCP). (Handouts #D-4 - #D-4e) There is also available a Tool Kit which allows the user to design software for the Touch Window and offers an alternative for increasing applications for exceptional students.

Unicorn Expanded Keyboard

The Unicorn Expanded Keyboard is widely regarded among special education and rehabilitation professionals as an alternate keyboard for the Apple IIseries of computers and the IBM. The complete system for the Apple and IBM requires the Adaptive Firmware Card which is sold separately by Don Johnston Developmental Equipment Inc. Features of the Unicorn Expanded Keyboard include:

1. A membrane keyboard which features 128 large, touch-sensitive, user-definable keys

2. A sturdy, acrylic base with rounded corners, non-skid rubber feet, and a tough, smooth and washable surface

3. Overlays which allow the creation of custom keyboards - keys can be labeled with characters, words, phrases, symbols, pictures, colors, tactile materials and braille

4. Option to group keys together to function as a single, larger key

With the complete Unicorn Expanded Keyboard/Adaptive Firmware system, features include:

1. Use of almost all commercial software

Unicorn Expanded Keyboard (Continued

2. Flexibility to define keys to represent a single character or an entire message of up to 40 characters

3. Storage of an unlimited number of custom keyboard layouts on disk

4. A programmable time delay which permits users to slide their hands across the keyboard without triggering unwanted keys

5. Operation of the computer with one hand or head wand

6. Compatibility with Echo II and other speech synthesizers

7. Option of other input modes and features offered by the Adaptive Firmware Card

The Expanded Keyboard is used widely and successfully by students with cerebral palsy and other physical impairments, visual impairments, developmental delay, and other learning disabilities. It can be used in amusement parks and museums to give the public access to computers and computerized displays. Handicapped adults can use the Expanded Keyboard to gain access to the full capabilities of the computer.

The Unicorn Expanded Keyboard is available from:

Unicorn Engineering Company
6201 Harwood Avenue
Oakland, CA
Phone (415) 428-1626

Directions for operating the Unicorn Keyboard are included in Handouts #D-5 #D-5g.

The Florida Expanded Keyboard is another example of a touch sensitive device that can be used to put information into the computer. The Florida Expanded Keyboard can be programmed to customize the overlays and it has software that will interface with the Echo Speech Synthesizer. The Florida Expanded Keyboard and the Unicorn Expanded Keyboard are both available from:

Exceptional Computing Inc.
450 N.W. 5th Street
Gainesville, FL 32607
(904) 331-8847

SECTION E

VOICE RECOGNITION

Objective: To discuss and demonstrate the use of speech input as an alternative to the keyboard for students who lack motor skills but possess consistent vocal patterns.

Time: 15 minutes - 3 hours depending on selection of activities.

Materials:
INTROVOICE installed in an Apple IIe
INTROVOICE I STANDALONE DEMO DISK
INTROVOICE I SYSTEM MASTER DISK
INTROVOICE Startup Disk (Public Domain)
Blocks Math I Disk (Public Domain)
Fireorgan (Public Domain)
Selected Handouts #E-1 through #E-3b

Preparation:

1. Install an IntroVoice in an Apple Computer. Refer to Appendix Section B and the Introvoice manual.

2. Prepare copies of handouts. Copy Appendix Section B if participants will be involved in installing a system into an Apple computer.

3. Prepare backup copies of the demo disk, public domain disks and Voice-Utility Program Disk as needed.

4. Read the "Notes for the Instructor" and the user's manual carefully. Voice recognition is a complex technology, but using the demo disk, it is possible to give a simple demonstration without going into some of the more complex features of the device.

5. Before the workshop, the instructor should practice training the computer to her own voice pattern several times so that she is familiar with the procedure.

6. Determine if the workshop will be exclusively on voice recognition or if this topic will be combined with other selected adaptive devices included in Sections B-G of Module 5.

7. It is recommended that installation of the Introvoice be completed by the instructor prior to the workshop. The installation procedure is complicated and most people will use the system without needing to understand this part of the technology.

Preparation:

8. Determine which option or combination of options the instructor will use for a particular workshop:
   a) Discuss voice recognition and its potential use with exceptional students
   b) Demonstrate voice recognition using the INTROVOICE I STANDALONE DEMO Disk.
   c) Provide hands-on experience in a lab setting using the INTROVOICE I STANDALONE Demo Disk.
   d) Provide hands-on experience in a lab setting using the INTROVOICE I SYSTEM MASTER.

9. More complete procedures for the use of the INTROVOICE I STANDALONE DEMO DISK AND THE INTROVOICE I SYSTEM MASTER can be found in the Handouts #E-l through #E-la and #E-2 through #E-2d, respectively.

Procedures:

1. Using the "Notes for the Instructor" and referring to Handout #E-l, discuss the use of voice recognition as an access method for severely physically-handicapped students.

2. Discuss and demonstrate the "state of the art" of present voice-recognition technology and potential improvements in that technology.

3. Using Handout #E-l and Handouts #E-3 through #E-3b have participants train the computer to their own voice patterns using the INTROVOICE I STANDALONE DEMO DISK.

4. For advanced training, use Handout #E-2 and the INTROVOICE I SYSTEM MASTER DISK. Refer to the Handout for detailed directions on using the System.

Resources: Appendix B
IntroVoice manual.

NOTES FOR THE INSTRUCTOR

Voice Recognition

This section of Module 5 is designed to introduce workshop participants to Voice Recognition. It does not address the more complex features of the device.

One of the primary goals for an exceptional student should be the efficient use of available tools. This efficiency is determined by the individual needs, limitations and abilities of the particular student. Computer technology provides many new tools that can allow a student to interact with their environment in both learning and control situations. One of these tools is speech recognition equipment, where a student's voice controls computer operation.

Current speech-recognition equipment has both advantages and disadvantages which must be weighed in terms of maximizing efficiency for the student. The most efficient means of operating a computer, of course, is the use of the keyboard that is part of the computer system. Two categories of students find the keyboard to be an insurmountable obstacle: (1) physically-impaired students with little or no fine-motor control, and (2) mentally-impaired students whose attention span is so limited that, if they have to look away from the screen (monitor or TV) to look down at the keyboard, they will have forgotten what they are to type.

Available speech-recognition equipment offers complete control of a computer. The hardware provides fully transparent control, so that any software may be used with the system. There are, however, two limitations. First, the directional microphone that is part of the system balances two features: sensitivity and ambient noise immunity. Thus, if a student is unable to project sound sufficiently, the system may be unworkable. Secondly, the student must be able to be trained to make repeatable sounds for each of the vocabulary items selected. Note that speech is referred to as soundsl the student may, in fact, be classified as non.vocal. Articulation is much less important than repeatability and projection capabilities.

The Voice Connection, 17835 Skypark Circle, Suite C, Irvine, CA 92714, (714)261-2366, offers a line of Speech-Recognition equipment (IntroVoice) for a variety of computers that meets the above criteria. For detailed information, contact the manufacturer.

SECTION F

ADAPTIVE FIRMWARE CARD

Objective: To discuss and demonstrate the use of the Adaptive Firmware Card as a transparent device for

1) switch control
2) expanded keyboard

Time: 15 minutes - 3 hours depending on selection of activities.

Materials:
Adaptive Firmware Card
Zygo Switch Kit
Expanded Keyboard (if available)
Echo Speech Synthesizer
Handouts #F-1 through #F-10b
Academics with Scanning - University of Washington (Apple public domain disk available from local FDLRS Associate Centers)

Preparation:

1. Read through the "Notes for the Instructor" and the user's manual for the Adaptive Firmware Card carefully. The Adaptive Firmware Card is a complex technology. It is possible to give different levels of technical instruction depending on the needs of the workshop participants. The instructor needs to determine what level of instruction is most appropriate.

    a. For simple demonstrations of the technique of scanning, the instructor does not need to activate the Adaptive Firmware Card. Using the software, Academics - Math with Scanning - University of Washington, and the Model 100 Caffelle Adaptive Interface Card, and a sample switch from the Zygo Switch Kit, the instructor can demonstrate and discuss the principles of scanning and its application with exceptional students.

    b. The instructor may elect to have the SETUP program of the Adaptive Firmware Card operational so that the use of the device with commercial software can be demonstrated and discussed.

    c. The instructor may elect to have workshop participants install the Adaptive Firmware Card and complete the SETUP operation. Use Handout #F-1a.

    d. The instructor may elect to have workshop participantsuse switches or expanded keyboards with the Adaptive Firmware Card or both. Use Handouts #F-5 through #F-8 as appropriate.

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Preparation:

e. The instructor may elect to have workshop participants use pre-programmed scanning arrays and expanded keyboard formats or may have participants program individualized customized arrays and keyboards. Use Handouts #F-2 and #F-9 as appropriate.

f. The instructor may elect a variation of any of the above options.

This section only addresses the use of the Adaptive Firmware Card with pre-programmed scanning arrays and expanded keyboards. For customized programming refer to the user's manual. Additional information can be found in the Appendix, Section C.

2. Install the Adaptive Firmware Card in an Apple computer. Test the system.

3. Select and display appropriate peripheral devices including the Echo Speech Synthesizer, Zygo Switch Kit and Expanded Keyboard.

4. Select appropriate software to demonstrate the hardware. Include at least one commercial disk that demonstrates the use of the Adaptive Firmware Card and a switch.

5. Make copies of the handouts.

6. Determine if the workshop will be exclusively on the Adaptive Firmware Card or if this topic will be combined with other selected devices included in Sections B-G.

Procedure:

1. Select, from the options listed in #1 under Preparation, the level of technical instruction that will be presented to workshop participants.

   a. Demonstrate scanning with switch control using commercial software.

   b. Demonstrate the installation and initialization of the Adaptive Firmware Card.

   c. Demonstrate the expanded keyboard option using an Expanded keyboard with commercial software.

2. Refer to "Notes for the Instructor" and handouts as appropriate.

Resources: Adaptive Firmware Card user's manual

Appendices C, E, G, H, K, O, R, S, U, V, W and X

NOTES FOR THE INSTRUCTOR

Tips for Using the Adaptive Firmware Card with Young Handicapped Children

The following information is adapted from an article written by Kate Whitaker, Project ACTT (Activating Children Through Technology, Western Illinois University) and is reproduced with her permission.

The Adaptive Firmware Card has proven to be a very versatile tool for use with young handicapped children. Although the old Adaptive Firmware Card for the Apple II+ computer was extremely difficult for someone without a great deal of computer hardware expertise, the new, revised firmware card has greatly facilitated its use. Unfortunately, the negative nuances of the former card have prevented special educators from making use of the extraordinary features of the new Adaptive Firmware Card, version IIe which can be used in any slot.

The primary function of the Adaptive Firmware Card is to enable children and adults for whom the computer keyboard is inappropriate to use commercial software with switches or adaptive keyboards. The Adaptive Firmware Card is a transparent card which "fools" the computer into thinking the computer keyboard is operating the program when in actuality, it is a single switch or adaptive keyboard which is the input device. There are many other uses for the Card which are explained in detail in the manual which accompanies the Card.

The teacher needs to know the software program for which he wants to provide alternative access. There are several items which must be considered in order to develop individualized scanning arrays or adaptive keyboard design. First of all, the type of input method should be determined. Will the program be set up for scanning or for alternate keyboard input? Scanning requires at least two switch presses to operate: one to turn on the scanning array, and one to select the appropriate key within the array. The adaptive keyboard enables the child to directly select the appropriate key. Therefore, the simplest input method would be the adaptive keyboard. Unfortunately, the membrane or adaptive keyboard is an additional $400.00 expense.

Once the input method has been established, the teacher needs to make some decisions. For a scanning input method, the teacher will need to determine:

1. how many keys to place in the scanning array,
2. what order to position the keys, and
3. the words or symbols which should appear in the scan.

Write these down before setting up the scanning array. The Adaptive Firmware Card does not need to be on to design the scan, but it cannot be tested until it is turned on.

The user should first design several individualized scanning arrays before tackling the more intricate features of the Card. It is important that the user have a basic understanding of how the Card works in order to effectively use it with students. The best way to do this is to use a backup copy of the Adaptive Firmware Card Setup Disk and the manual and design a few simple scanning arrays using the screen prompts. Keep in mind that disks are available which utilize the Echo speech synthesizer (Street Electronics) for designing auditory as well as visual scanning: The Talking Word Board and The Talking Unicorn. These disks require 128k and an Echo speech synthesizer. Within minutes the average user should be able to set up a simple scanning array.

If the teacher has chosen to use the membrane keyboard as an input method, the same pre-design factors of key selection and placement need to be determined. Programming the membrane keyboard (such as the Unicorn Membrane Keyboard) is an extremely useful feature of the Adaptive Firmware Card. Each key on the keyboard may be assigned a letter or group of letters, or the user may choose to program blocks of keys at one time. In this way the keyboard may be divided into half, quarters, or any way which will meet the needs of the end user. Not only does the keyboard allow instant program operation, but it also defeats the need for scanning, which is very difficult and even impossible for some severely handicapped students. These keyboard designs may then be saved on disk and used repeatedly. They may also be edited.

Once the simplicity of using the Adaptive Firmware Card for the creating of scanning arrays and membrane keyboards is internalized, the user may wish to take advantage of the three function control options. Option one enables the user to change the method and rate of input while still operating the program. Pressing Control (^) A 1 will enable the user to slow the scanning speed while using a program after the "saved" scan has been loaded into memory. This avoids the need to reboot the system.

Option two presents a number of parameters which allows more versatility to the use of the software (such as paddle and joystick emulation). By pressing Control (^) A 2, the user may use many commercially available programs which utilize joysticks or paddles as input devices with one or two single switches. This option has many other uses including designing ways to use single switches with word processing programs and the "Slowdown" option. Often, word processing programs require a double key input such as "Shift C" to obtain a capital c or a Control (^) with a letter for editing purposes. The Firmware Card enables single switch users to perform double key functions with two switches. "Slowdown" works with very few commercially available programs. It is intended to slow programs down so that handicapped users have more time to use slower input methods. These options have more applications for older handicapped users.

The third option of the Firmware Card enables the user to save these parameters in a special setup area on the Card. Every time the program is used with a specific student the user may simply load the saved parameters, from a setup area on the card into the computer's memory. This option may be accessed by using Control (^) A 3.

TIPS FOR USING THE ADAPTIVE FIRMWARE CARD

1. When you first receive your Card, be sure to initialize it for the slot you place it in. Load the memory routine on the card. The switch should be in the "off" position.

2. If the card is turned on and you see small squares on the monitor and nothing else, your card or cable may not be crashed. Your Card may need re-initializing. This seems to happen quite frequently if your on/off switch on the input box is bumped frequently. If this happens:

   a. Boot up the Adaptive Firmware Card Start-up Disk.

   b. Select "0" to initialize the Card.

   c. Select "2" to load the memory routines back on the Card.

   d. Try using the Card again. If there is still "garbage" on the screen, try new batteries before following these four steps again.

3. Be sure to plug in the correct number of switches or the membrane keyboard before loading customized programs. Sometimes the Card can handle "late plug-ins." Sometimes you have to reload all of your routines.

4. The manual states that you can turn your Card on and off with no problems. Generally speaking this is true primarily for the game parameter setups where no specific routines are loaded into the Card's memory.

5. Plug and unplug all switches and the membrane keyboard before turning the computer or the Adaptive Firmware Card on. Sometimes the setup routine will crash if switches are attached while the card is on. The static electricity may also damage the computer or Firmware Card.

6. The input methods most applicable for students are:

   Normal: Keyboard input only. Switches may be connected to the I/O box to function in place of paddles.

   Scanning: This scanning mode is used with simple alphabet scanning or individually created scanning arrays.

   Expanded Keyboard: This is the mode used with an adaptive keyboard such as the Unicorn.

7. Input rates very. Five (5) appears to be a fairly generic choice. The rate of scanning can be easily changed while the program is in operation (^A 1).

8. The Adaptive Firmware Card does not work with all programs. It is best to try it with a program before purchase to guarantee compatibility.

9. Before designing a scanning array, make a written list of the letters (characters) necessary to operate the program normally. Consider some of the following physical aspects:

   a. The number of letters/characters which a child can handle in an array.

   b. The placement of these letters/characters in the array.

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SECTION G

SWITCH CONTROL

Objective: To demonstrate various types of available switches and their use with physically impaired students

Time: 30 minutes - 2 hours, depending on activities selected and amount of hands-on experience

Materials:
Transparencies #G-1 through #G-9
Handouts #G-1 through #G-5
Zygo Switch Kit
Sample toys adapted for switches
Adaptive Interface Box (Caffelle)
and/or Adaptive Firmware Card
Electronic Communication Devices - A Slide Series, Set B available from Queens College, 65-30 Kissena Blvd. Flushing, NY 11367, (212) 520-7358
Sample constructed switches (if available)
Burkhart, Linda. Homemade Battery Powered Toys and Educational Devices for the Severely Handicapped. Linda J. Burkhart, 1980.
Burkhart, Linda. More Homemade Battery Devices for Severely Handicapped Children with Suggested Activities. Linda J. Burkhart, 1985.
Wright, Christine. From Toys to Computers: Access for the Physically Disabled Child. Christine Wright, 1985.

Preparation:

1. Make transparencies from the masters.
2. Make copies of appropriate handouts.
3. Select sample switches, switch-activated, battery-operated toys, and resource materials to display.
4. Have an Apple IIe computer set up with an Adaptive Firmware Card and/or Adaptive Interface Box installed.
5. Have a slide projector and screen available.
6. Prepare several "homemade" switches for demonstration if desired.
7. Determine if the workshop will be exclusively on switches or if this topic will be combined with other selected devices included in Sections B - G.

Procedure:

1. Refer to the "Notes for the Instructor" and use Handouts #G-1 through #G-1F to discuss the purpose, selection and function of switch control.

Procedure:

2. Demonstrate several different types of switches using battery operated toys and the Apple IIe with Adaptive Interface Box and/or Adaptive Firmware Card. Refer to Handout #G-3.

3. Refer to the list of resources for information on how to construct homemade battery devices and demonstrate any that might be available. Refer to Handouts #G-2 and #G-4.

4. Discuss the process of selecting a switch that is appropriate for the user. The ability of the user to make consistent, reliable activations of the switch is very important. The positioning of the user for long-term comfort and trunk control must also be considered.

5. Discuss ways of positioning the switch for easy, comfortable access by the user. For example, discuss alternatives such as wheelchair mounts.

6. Discuss the importance of using a team to evaluate and select an appropriate switch for a handicapped child. Refer to Section A and Handouts #A-5 through #A-5e for more information or suggested team evaluation procedures.

Resources: Appendices A, C, G, H, K, O, R and S

Burkhart, Linda. Homemade Battery Powered Toys and Educational Devices. Linda J. Burkhart, 1980.

Burkhart, Linda. More Homemade Battery Devices for Severely Handicapped Children With Suggested Activities. Linda J. Burkhart, 1985.

Wright, Christine. From Toys to Computers: Access for the Physically Disabled Child. Christine Wright, 1985.

Helplessness is seldom absolute; it is almost always a matter of degree. Even the blinking of an eye may be seen as a form of self-help. It lubricates the eye, which is one task which will not have to be done by an attendant. Helplessness can be reduced through training programs such as "Active Stimulation Programming" (ASP) developed by Dr. Edmond S. Zuromski. The purpose of ASP and similar programs is to help severely handicapped individuals develop new mobility, greater range of motion, increased abilities, new understanding, and broadened forms of communication. In many cases, progress is glacial and may take extended periods of time, however, the alternative is "passive stimulation" which is all those things that people "do to" the students. Teachers provide many visual, auditory and sensory experiences "for" students in the hopes that they will respond, but in the case of severely impaired students, the response may be so subtle or occur so seldom that it goes unnoticed by the staff. Over a period of time, students may come to expect that the important events in their lives do not depend on their own responses. They have moved into a state of "learned helplessness." People in this state stop trying to control events in their lives. They may even forget that they ever had any ability to exert such control, and their ability to learn new actions or responses may be severely impaired. A long period of such helplessness can produce emotional disturbance, primarily in the form of depression.

The purpose of an active stimulation program is to help students learn--or relearn--that their own responses can make things happen which they like. They begin to make things happen for themselves.

To effectively implement a stimulation program, it is necessary to assess the student and to select an appropriate reinforcer that will be motivational. Reinforcers include battery operated toys, slide projectors, fans, vibratory pads, tape recorders, televisions, radios or any similar device that may be turned on and off with a simple electrical switch.

Some students have very infrequent and inconsistent responses and movements. A teacher could sit for a long period of time and wait for a particular movement to be repeated so it can be reinforced. If the same student is set up with a switching mechanism and a system for reinforcing spontaneous movement, the teacher does not have to be immediately present for the child to be reinforced. The system gives a consistent response even if the frequency of the desired behavior is very minimal. It allows severely, profoundly and multiply handicapped people to function independently.

The initial goals of active stimulation are usually very elementary: to encourage movement or changes in posturel to reward behavior which makes the person more independent in some small but crucial way; to develop awareness of cause and effect. But the process is cumulative and can lead to greater developmental changes.

Resource: "Active Stimulation Programming: An Alternative to 'Learned Helplessness.'" Overview: Washington State Department of Social and Health Services. Vol. 12, No. 5, May 1984.

Switch Control

One frustration frequently evident in handicapped children is that they are not able to explore, manipulate, and play with their world, i.e.. their environment. The result MAY BE less constructive stimulation to the child's brain, and a more passive, dependent attitude. The child learns to be helpless. To assist with this problem, there is a need to explore and implement cost-effective, individualized instruction for the handicapped student to help them realize their potential in communication, education and vocation. The very physically involved student is unable to work in a regular school setting and may lack written and oral communication skills as well. The handicapped child frequently has a slow rate of response to stimuli which lengthens instructional time. Furthermore, no students function with the same physical handicaps or on the same instructional level. The challenge to education is to provide a structured, individually planned and individually presented learning environment. Creative application of the microcomputer and selected software can help educators to meet the challenge.

A variety of adaptive switches are now available commercially which make it possible for a handicapped student to run computer software. In addition, directions for making simple switches are available. The wide variety of switches enable educators to select and position a specific switch that is appropriate for a specific individual. Switches can be used with commercial software that has been adapted to accept switch signals; with public domain software that has been programmed to accept signal input; or with a "transparent" keyboard emulator such as the Adaptive Firmware Card.

There is only a limited amount of software that is specially written to accept single or dual switch input, therefore, purchase of a keyboard emulator is recommended for students who require this mode of computer access.

To select a particular switch for an individual, the student should be evaluated preferably by a team of educators that might include the occupational specialist, physical therapist, classroom teacher, speech and language clinician and other appropriate staff. The team can provide a more complete evaluation that addresses the total development of the handicapped student.

After a switch has been selected, it is critical to work with the student to position the switch for independent use and to train the student to use the switch with maximum efficiency. Switches can be positioned alongside any part of the body over which the individual has some voluntary control, and consistent movement. The Zygo Adaptive Fixtures Kit can be used by non-engineering staff persons to mount and position switches for use by students in a variety of settings. If funds are not available for the purchase of the kit, a good set of hardware tools will be needed in addition to clamps, adapters, tubes, rods and mounts. With experience and an open mind, educational personnel can gain confidence in configuring proper positioning of switches for physically impaired students. These configurations can always

be improved and adjusted as experience increases. The Zygo Switch Kit (available at all FDLRS Centers) includes a sampling of the most commonly used switches including the Leaf Switch, Treadle Switch, Touch Sensitive Switch, Thumb Switch, Squeeze Switch and the Pneumatic Switch. (Refer to Handout #G-1, #G-1d.) The Zygo Switch Kit can be used by the evaluation team to test various switches with the handicapped students to determine the most appropriate selection.

Once a switch is selected for a student, it is important to provide training opportunities until the user considers the switch to be a natural extension of himself. The switch should complement the user's capabilities and increase his efficiency and productivity so that the student is motivated to interact with the device that the switch is attached to. Toys are frequently used to introduce students to specific switches. (Refer to handouts #G-2 - #G-2b.) This initial training helps the student develop skills that can later be used on electronic communication and computer devices. Gaming software can also provide a motivational environment to help train students on single/or dual switch input. Motor Training Games, a public domain disk, provides 13 selections on the menu that are designed for non-verbal, multiply handicapped individuals.

Switches can be highly motivational to handicapped students who for the first time experience some control over their environment. Furthermore, some students are not able to maintain a position that is advantageous to their physical development as determined by a physical therapist but observation has indicated that some children may be able to maintain and tolerate these positions much longer when they are actively involved with a cognitive, visual or auditory activity that makes use of a properly positioned switch.

TIPS TO USE WHEN MAKING HOMEMADE SWITCHES

1. Do not attempt to facilitate a workshop on homemade switches without having first been involved in the actual construction of at least one switch.

2. If homemade switches will be constructed during a workshop:

   a. have multiple copies of the books by Linda Burkhart.

   b. select one switch for the group to construct together.

   c. cut and sort supplies for the switch and pre-package a kit in a clear plastic bag for each participant.

   d. ask participants to work in "pairs" to help each other.

   e. make sure esch participant has a copy of the directions on how to make the switch, and a list of materials and supplies available for use.

   f. check to see that there are sufficient electrical outlets for soldering.

   g. provide ample table space for participants to spread out their materials. Soldering irons get quite hot and participants should not be crowded.

3. Test homemade switches on a battery operated radio or adapted toy.

4. Maintain an inventory of basic supplies and tools used to make various types of switches. A partial list includes:

workboard ll"x14" (cut from scrap wood)
bar plug extensions
scissors
roll of double-sided tape
2 conductor, 22 gauge, double-stranded wire
subminiature jacks
sheets of copper
electrical tape
9-volt batteries
pliers
hand drill with bits
20 gauge hookup wire
sandpaper
wire stripper
masking tape
soldering iron
coil of solder
tweezers
subminiature plugs
miniature plugs
small vise
hot-glue gun
glue sticks
long-nose pliers
D batteries
wire cutters
miniature jacks
X-acto knife
precision screwdrivers
needle-nose pliers

TIPS FOR TEACHERS OF EXCEPTIONAL STUDENTS

Introduction

It is important to consider the unique needs of a student when you select computer equipment and programs. The enclosed handouts provide the Florida State Board of Education Rule, definition and general characteristics of the exceptionalities. There are also suggested computer strategies for working with a specific handicapping condition.

Teachers who have mainstreamed exceptional students need to become familiar with the nature and characteristics of the handicapping condition in order to help the student achieve his maximum potential. It is also important to know a student's strengths and limitations in order to structure an appropriate, non-threatening, learning environment. These principles apply to the use of computers, as well as to classroom instruction.

AUTISTIC

Definition: One who has a disability reflected in severe disorders of communication, behavior, socialization and academic skills, and whose disability was evident in the early developmental stages of childhood. The autistic child appears to suffer primarily from a pervasive impairment of cognitive and perceptual functioning, the consequences of which are manifested by limited ability to understand, communicate, learn, and participate in social relationships. (State Board of Education Rule 6A-6.03023).

AUTISTIC COMPUTER STRATEGIES

1. Choose software that provides immediate, graphic response to input.

2. The computer may offer a method of communication for the autistic student.

DEVELOPMENTALLY DELAYED COMPUTER STRATEGIES

1. Choose software programs which are appropriate for your child's ability level. This may be different from the age level stated on the software package.

2. Consider your child's ability and visual-motor skills. If keyboarding can be learned it could open up a job opportunity. Software is available to help develop and build keyboarding skills.

3. If your child is profoundly handicapped, he may benefit from learning to use switches to first control battery-operated toys, radios, and tape players. If the switches can be mastered, they can later be used to operate a computer. Programs are available which stimulate the senses and increase attention span. Color graphics and sound are important features.

EMOTIONALLY HANDICAPPED

Definition: The emotionally handicapped is one who after receiving supportive educational assistance and counseling services available to all students still exhibits persistent and consistent severe behavioral disabilities which consequently disrupt the student's own learning process. This is the student whose inability to achieve adequate academic progress or satisfactory interpersonal relationships cannot be attributed primarily to physical, sensory or intellectual deficits. (State Board of Education Rule 6A-6.3016).

COMPUTER STRATEGIES FOR EMOTIONALLY HANDICAPPED

1. Some emotionally handicapped children respond better to the computer as a learning tool than any other method of instruction.

2. Use of favorite programs can become a powerful motivator for some children. When used along with behavior modification programs, the computer and appropriate software may help change behavior.

3. If your child needs to learn relaxation techniques, consider programs which allow biofeedback visually.

4. Avoid software which:

   - has negative comments
   - makes it more fun to be wrong than right
   - frustrates the child
   - may overstimulate the child

5. Be sure the student knows what he will be expected to do while on the computer. A structured program and schedule are desirable.

6. Select software that is challenging, requires a short period of time, and allows success to help build self-confidence.

7. Select software that begins on a student's developmental level and increases difficulty in small, sequential increments.

COMPUTER STRATEGIES FOR EMOTIONALLY HANDICAPPED (Continued)

8. Select software initially that concentrates on the student's strengths and minimizes his weaknesses.

9. Be sure the emotionally handicapped student understands the appropriate behavior to use at the computer and the consequences for inappropriate behavior.

10. Note whether a student displays hyperactive or withdrawn behavior. A hyperactive student should be one-on-one with the computer. A withdrawn student should be given the opportunity to work with a partner.

HEARING IMPAIRED

Definition: A hearing impairment is a hearing loss of thirty (30) decibels or greater, pure tone average of 500, 1000, 2000Hz, ANSI, unaided, in the better ear. (State Board of Education Rule 6A-6.03013).

a. Deaf - Deaf individuals are those whose hearing impairment is so severe that they cannot learn speech and language through normal channels and who need extensive instruction in order to develop language, communication and academic skills.

b. Hard of Hearing - Hard of hearing individuals are those whose residual hearing is adequate for learning speech, language, and academic skills through normal channels, provided that classroom and instructional modifications are made.

COMPUTER STRATEGIES FOR HEARING IMPAIRED

1. When you buy computer equipment consider purchase of a modem. It will enable the hearing impaired child to communicate over the phone line with others who also have a computer and modem.

2. Make sure that the language of the programs used matches the child's ability level.

3. Look for software programs which allow you to enter vocabulary, or other material, your child is learning.

4. Select software that encourages the student to communicate.

5. When appropriate, have hearing impaired students work on the computer in pairs to encourage communication skills.

6. Be sure hearing impaired students are prepared for computer safety procedures (i.e., a sudden power failure - student should turn the computer and monitor off immediately).

7. Select software that begins on the student's developmental level and increases difficulty in small, sequential increments. Allow for success to build such confidence.

8. Use speech synthesis if there is residual hearing.

PROFOUNDLY MENTALLY HANDICAPPED

Definition: One who is profoundly impaired in intellectual and adaptive behavior and whose development reflects a reduced rate of learning. The measured intelligence of a profoundly retarded student generally falls below five (5) standard deviations below the mean and the assessed adaptive behavior falls below age and cultural expectations. (State Board of Education Rule 6A-6.3011).

TRAINABLE MENTALLY HANDICAPPED

Definition: One who is profrately or severely impaired in intellectual and adaptive behavior and whose development reflects a reduced rate of learning. The measured intelligence of a trainable mentally retarded student generally falls between three (3) and five (5) standard deviations below the mean and the assessed adaptive behavior falls below age and cultural expectations. (State Board of Education Rule 6A-6.3011).

EDUCABLE MENTALLY HANDICAPPED (EMH)

Definition: One who is mildly impaired in intellectual and adaptive behavior and whose development reflects a reduced rate of learning. The measured intelligence of an educable mentally retarded student generally falls between two (2) and three (3) standard deviations below the mean and the assessed adaptive behavior falls below age and cultural expectations (State Board of Education Rule 6A-6.3011).

COMPUTER STRATEGIES FOR MENTALLY HANDICAPPED

1. Choose software programs which are appropriate for the child's ability level. This may be different from the age level stated on the software package.

2. Consider the child's ability and visual-motor skills. If keyboarding can be learned it could open up a job opportunity. Software is available to help develop and build keyboarding skills.

3. If the child is profoundly handicapped, he may benefit from learning to use switches to control battery-operated toys, radios, and tape players. If the switches can be mastered, they can later be used to operate a computer.

COMPUTER STRATEGIES FOR MENTALLY HANDICAPPED (Con't)

4. Programs are available which stimulate the senses and increase attention span.

5. Color graphics and sound are important features.

6. Avoid software that makes it more fun to be wrong than right or that frustrates the student.

7. Be sure the student understands how to operate the software. Verbal directions, demonstration and/or assistance may be necessary for some students.

8. Select software that requires a short period of time and allows success.

9. Select software that begins on a student's developmental level and increases difficulty in small, sequential increments.

10. Select software initially that concentrates on the student's strengths and minimizes his weaknesses.

11. When appropriate, have students work in pairs on the computer.

12. Use speech synthesis to reinforce the software content auditorially.

PHYSICALLY IMPAIRED

Definition: A physically disabling condition or other health impairment which requires an adaptation to the student's school environment or curriculum. (State Board of Education Rule 6A-6.03015).

Physical disabilities vary greatly, therefore, each student with a handicapping condition must be considered individually.

COMPUTER STRATEGIES FOR PHYSICALLY IMPAIRED

1. Determine if the student can access the computer using the standard keyboard or if adaptations to input are required.

2. Determine if the student can successfully complete multi-key functions such as SHIFT and a letter, or CTRL, OPEN APPLE, RESET.

3. Determine if the student can make a clean strike on the keys of the keyboard to avoid accidental input from the repeating key feature of the standard computer.

4. If an alternate input method is required for a student, consult with appropriate staff such as the FDLRS Instructional Technologist, Occupational Therapist, Physical Therapist, etc., before a final selection is made. Alternate input methods could include switches, touch tablets or voice recognition.

5. If a student is subject to seizures, avoid programs which have rapidly blinking graphics or print.

6. Select software that can be customized for individual needs. Some software allows the teacher to customize options such as:
   - response time
   - presented time
   - scan speed for switches
   - sound or no sound
   - level of difficulty

7. The computer can become a communication tool for non-vocal students.

8. For students with limited fine-motor skills, word processing can be used as a valuable tool for written communication.

9. Computers are used to help severely physically involved students control their environment. Equipment and programs are available which control lights, radios, TVs, telephones, etc.

LEARNING DISABILITIES

Definition: A disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural or economic disadvantage. (State Board of Education Rule 6A-6.3017).

1. The child does not achieve commensurate with his or her age and ability levels in one or more of seven specific areas when provided with learning experiences appropriate for the child's age and ability levels.

2. The team finds that a child has a severe discrepancy between achievement and intellectual ability in one or more of the following areas:

oral expression	listening comprehension
written expression	reading comprehension
basic reading skill	mathematics calculation
mathematics reasoning	

COMPUTER STRATEGIES FOR LEARNING DISABLED

1. The computer can be an important tool for the learning disabled child:

   a. Consider purchasing a simple word processing program.

   b. A spelling checker program can be used with the word processing software to check work for spelling errors.

   c. Software to build typing skills would be helpful.

2. Look at the size and clarity of the print when buying software. Make sure it is easy for the child to read.

3. Check the use of graphics and sound. It is important that the display does not distract from the task.

4. Avoid programs with too much visual clutter.

5. Some programs can help visual-motor skills. However, make sure that software which requires the use of game paddles or highly coordinated finger manipulation of fingers on the keyboard matches the child's ability.

6. Provide a structured environment at the computer so that the student knows performance and behavior expectations.

7. Where necessary, provide "prompt aids" or "learning aids" for the L.D. student. This might include a list of words to use with spelling software or a list of commands used with word processing software.

8. Select software, appropriate to the student's developmental level, that keeps the student on-task and allows him success. Increase difficulty in small increments.

9. When appropriate, pair students at the computer.

10. Make sure the L.D. student understands how to operate a program. Software may have complex directions that are easier to demonstrate or read aloud than to read silently from the screen or manual.

11. Relate the use of a specific piece of software to a student's previous learning experience.

12. Provide speech synthesis to give auditory reinforcement.

13. Select shell software that permits the teacher to create a data file so that software can be customized to fit a particular lesson.

Project ACTT*

Name: _____

Staff Computer Competencies

for Working with Handicapped Children

Date Acquired

Computer Competencies

1.0 Assemble a computer station.

- 1.1 Assemble computer, monitor, and disk drive. _____
- 1.2 Attach touch tablets, Input/Output boxes, joysticks to the computer's gameport. _____
- 1.3 Insert switches into their appropriate plugs on the Input/Output box. _____
- 1.4 Insert firmware cards into their appropriate slots. _____

2.0 Obtain information about current "State of the Art" equipment, peripherals, and software available on the market.

- 2.1 Place name on computer mailing lists _____
- 2.2 Identify software catalogs _____
- 2.3 Use library resources _____
- 2.4 Identify educational computer magazines _____

Computer Application Competencies

3.0 Determine whether the computer is an appropriate mode for children to use.

- 3.1 Assess child's abilities to use the computer.
  - 3.11 Determine the child's awareness of cause and effect
  - 3.12 Determine the child's reliable movement(s) for which a switch could be adapted _____

*Activating Children Through Technology (ACTT)
27 Horrabin Hall
Western Illinois University
Macomb, Illinois 61455
(309) 298-1014

3.13 Conduct sensorimotor evaluation(Uzgiris/Hunt) _____

3.14 Determine child's I.E.P. goals _____

3.15 Determine restrictions in child's visual field _____

3.16 Determine restrictions in child's motoric functioning _____

3.17 Determine child's cognitive abilities _____

3.18 Identify learning modes of the child (i.e., can the child learn better using the computer because of its versatility with speech synthesis, voiced input, scanning capabilities?) _____

3.19 Assess whether child responds better to visual or auditory stimuli _____

3.2 Evaluate functional computer uses for the child.

3.21 Identify language/communication possibilities and programs for language therapist _____

3.22 Identify visual/braille possibilities for vision consultant _____

3.23 Identify motoric/environmental control possibilities for PT/OT _____

3.24 Identify problem solving strategies for teacher regarding general thinking skills and cognitive functioning. _____

4.0 Determine type of computer, hardware, and peripherals that would be most functional for the child.

4.1 Evaluate long-term computer potential.

4.11 Identify off computer activities which would reinforce computer input methods and instructional goals. _____

4.12 Identify for family possibilities of purchasing/ using a computer at home (Identify resources of used equipment, funding sources, etc.) _____

4.13 Determine the availability of peripheral devices for the machine with family (open structure, program compatibility, cost, ease of use) _____

4.2 Secure hardware modifications as needed (attachments to touch tablets, modifications in texture for visually impaired).

4.21 Design and develop keyboard overlays for specific programs used with child _____

4.22 Design and develop peripheral overlays for specific programs used with child _____

5.0 Determine type of software which would be most functional for the child.

5.1 Use functional software with children.

5.11 Identify software applications which meet IEP goals _____

5.12 Modify the intended uses of software programs _____

5.2 Identify software which can be single switched with an Input/Output box.

5.21 Identify commercial programs designed for single switch use _____

5.22 Identify programs which operate with paddle buttons _____

5.23 Identify resources for pre-programmed software utilizing single switch input which is appropriate for young children _____

5.24 Identify public domain software which is designed for switch uses _____

5.3 Assess the efficiency of the single switch input.

5.31 Assess consistency of use _____

5.32 Assess operational speed _____

5.33 Assess capabilities of immediate reinforcement _____

5.34 Assess number of input presses required _____

6.0 Use LOGO with children.

6.1 Identify major LOGO commands in the LOGO program

6.11 Use Forward, Back, Right, Left commands _____

6.12 Use PC, PU, PD BG, CS commands _____

6.13 Use Edit to create procedures _____

6.14 Use repeat command and recursives to shorten procedures _____

6.15 Save procedures and picture _____

6.16 Print procedures and picture _____

6.2 Identify and use LOGO commands in Instant LOGO.

6.21 Use Forward, Back, Right, Left commands _____

6.22 Use pencolor, penup, pendown, background clearscreen color commands _____

6.23 Use storage commands, name, and recall _____

6.24 Save procedures and picture _____

6.25 Print procedures and picture _____

6.3 Use questioning or problem solving approach in working with children and Instant LOGO.

6.31 Use LOGO in small group setting _____

6.32 Encourage children to seek assistance from other children _____

6.33 Use questions to help children formulate and test hypotheses _____

6.34 Use back-chaining to help children develop the skills to think sequentially backwards through a problem _____

6.35 Use flashcards, charts to help children develop action-symbol relationships, develop pre-planning, and memory skills _____

6.4 Develop off computer goals which reinforce the concept incorporated in LOGO.

6.41 Use correct terms with children during off computer time _____

6.42 Design and develop manipulative materials to place in computer area which reinforce goals of LOGO activity _____

6.43 Relate classroom activities to learning acquired during LOGO _____

7.0 Determine environmental design

7.1 Determine location for sessions _____

7.2 Identify strengths and weaknesses of computer environment for parents and staff _____

7.3 Control amount of stimuli present in computer environment

7.31 Lighting _____

7.32 Acoustics _____

7.33 Amount of stimuli in room _____

7.34 Proximity of room to other auditory distractions _____

8.0 Develop activities to use with handicapped children which reinforce the transfer and generalization of computer skills.

8.1 Design sessions for functional aspect of computer use (i.e., communicate needs during snack time) _____

8.2 Design non-computer activities which reinforce computer activities

8.21 Design activities which reinforce computer input methods (typing, scanning, switch presses vs. eye pointing) _____

8.22 Use actual objects with computer program when possible _____

8.23 Develop toy and object kits to place in computer area which are designed for same purpose as computer program _____

Alternative Input/Output Device Competencies

9.0 Use and adapt simple switches and switching devices.

9.1 Use a soldering iron.

Alternative Input/Output Device Competencies (Continued)

9.1 Use a soldering iron. _____

9.2 Troubleshoot simple circuitry problems. _____

9.21 Determine when a circuit is interrupted _____

9.22 Repair switches _____

9.3 Construct simple circuits (timers, etc.).

9.31 Construct battery interrupter _____

9.32 Construct normally open switch _____

9.33 Construct normally closed switches _____

9.34 Construct timer _____

10.0 Operate the peripherals used with the children.

10.1 Use printer _____

10.2 Use speech synthesis _____

10.3 Use graphics tablets _____

10.4 Use Input/Output boxes _____

10.5 Use membrane keyboards _____

10.6 Use the Adaptive Firmware Card _____

11.0 Determine switch type and placement.

11.1 Determine child's most reliable body movement.

11.11 Identify reliable movements with parents _____

11.12 Identify reliable movements with O-3 personnel or classroom teacher _____

11.13 Identify reliable movements with PT/OT _____

11.2 Determine type of switch most functional for the child.

11.21 Use various switches (i.e., tread, ribbon, pneumatic, pillow, joystick, mercury head switch, eyebrow switches) _____

11.22 Identify strengths and weaknesses of switches for parents, staff, and support personnel _____

11.23 Assess amount of effort needed by child to activate switch in relation to child's existing concept of cause and effect _____

11.3 Determining placement of switch.

11.31 Identifying strengths and weaknesses of switch placements with parents, staff, and support personnel _____

11.32 Modify switch placement according to OT/PT goals _____

11.33 Assess amount of effort needed to activate switch in relation to child's existing concept of cause and effect _____

11.34 Place switches in various positions (i.e., prone stander, wheelchair, floor, barrel chair) taking into account the child's easiest and most stable position _____

11.35 Evaluate child's response to switch location and determine progressive change in location if needed _____

11.4 Mount the switch in stationary position to allow for the most consistent switch pressing by the child.

11.41 Use masking tape velcro mounts _____

11.42 Use chair mounts _____

11.43 Use chest strap mounts _____

11.44 Construct individualized mount _____

12.0 Use Battery Operated Toys.

12.1 Choose battery operated toys which are reinforcing to the child.

12.11 Identify child's toy interests with parent _____

12.12 Encourage child to explore and respond to toy physically or with appropriate senses _____

12.13 Observe and assess child's response to sensory stimulus of toy _____

12.2 Evaluate use of toys.

12.21 Document the number of times the child is able to press the switch or activate the toy (to verify appropriate switch type and placement) _____

12.22 Document duration of child's activation of the toy _____

Child Progress Evaluation Competencies

13.0 Conduct pretests and posttests (sessions conducted without assistance).

13.1 Conduct baselines. _____

13.2 Set up group or single subject design. _____

14.0 Determine behaviors to observe. _____

15.0 Determine method of record keeping _____

Data Collection and Analysis

16.0 Perform word processing skills.

16.1 Enter, edit, and save text. _____

16.2 Merge files. _____

16.3 Use "Find and Replace" as an editing aid. _____

16.4 Write a block of text to a separate file. _____

17.0 Use a Data Base program.

17.1 Enter data into appropriate data management files. _____

17.2 Set up data fields. _____

17.3 Use "Search" and "Sort" capabilities to organize data. _____

18.0 Organize Data into evaluative report generation.

COMPUTER USER COMPETENCIES FOR TEACHERS

	Skill present prior to class	Date Achieved
1. Operate the computer		
Turn ON, OFF	Yes ___ No ___	_____
Use keyboard functions, controls	Yes ___ No ___	_____
Insert pre-programmed disks	Yes ___ No ___	_____
2. Run software		
Boot software	Yes ___ No ___	_____
Exit software	Yes ___ No ___	_____
Use appropriate commands	Yes ___ No ___	_____
Change from one program to another	Yes ___ No ___	_____
Give disks proper treatment	Yes ___ No ___	_____
Identify limitations, strengths	Yes ___ No ___	_____
3. Perform simple utility operations		
Initialize disk	Yes ___ No ___	_____
Copy DOS	Yes ___ No ___	_____
Copy files	Yes ___ No ___	_____
4. Modifying programs if appropriate		
Change rate of presentation	Yes ___ No ___	_____
Change difficulty level	Yes ___ No ___	_____
Modify reinforcers	Yes ___ No ___	_____
5. Use the computer as a tool	Yes ___ No ___	_____
Use word processing software	Yes ___ No ___	_____
Use data base software	Yes ___ No ___	_____
Use calculation software	Yes ___ No ___	_____
Use spread sheet software	Yes ___ No ___	_____
Use printing capabilities	Yes ___ No ___	_____
6. Evaluate software		
Evaluate tutorial programs	Yes ___ No ___	_____
Evaluate simulation programs	Yes ___ No ___	_____
Evaluate drill and practice programs	Yes ___ No ___	_____
Evaluate interactive programs	Yes ___ No ___	_____
Evaluate tool programs	Yes ___ No ___	_____
7. Develop simple programs		
Use authoring language	Yes ___ No ___	_____
Use Logo	Yes ___ No ___	_____
Use Basic	Yes ___ No ___	_____

COMPUTER USER COMPETENCIES FOR TEACHERS (CON'T)

	Skill present prior to class	Date Achieved
8. Read simple programs written by others	Yes ___ No ___	_____
9. Operate peripherals		
Use joysticks	Yes ___ No ___	_____
Use paddles	Yes ___ No ___	_____
Use printer	Yes ___ No ___	_____
Use light pen	Yes ___ No ___	_____
Use graphic tablet	Yes ___ No ___	_____
Use voice input and output devices	Yes ___ No ___	_____
Use modem	Yes ___ No ___	_____
Use Adaptive Firmware Card	Yes ___ No ___	_____
Use adapted keyboards	Yes ___ No ___	_____
Use switch input devices	Yes ___ No ___	_____
Use Voice Based Learning System	Yes ___ No ___	_____
Use touch screen	Yes ___ No ___	_____
Use video disk	Yes ___ No ___	_____
10. Use available resources in obtaining further skills		
Journals, trade magazines, books	Yes ___ No ___	_____
Software tutorials	Yes ___ No ___	_____
Network of colleagues	Yes ___ No ___	_____
Consortia M.U.S.E. Users Network	Yes ___ No ___	_____
Electronic bulletin boards, mail	Yes ___ No ___	_____
(Special Net)		
Information bases	Yes ___ No ___	_____
Commercial firms	Yes ___ No ___	_____
Electronic Computer Trade Shows	Yes ___ No ___	_____
Computer retailer	Yes ___ No ___	_____
11. Use computers in instructional programs with children and youth		
Schedule use	Yes ___ No ___	_____
Determine placement of computer	Yes ___ No ___	_____
Plan activities	Yes ___ No ___	_____
Determine computer function	Yes ___ No ___	_____
(tutor, tool, tutee)		
Determine content	Yes ___ No ___	_____
Carry out activity	Yes ___ No ___	_____
Evaluate activity	Yes ___ No ___	_____
Revise as needed and implement	Yes ___ No ___	_____

COMPUTER USER COMPETENCIES FOR TEACHERS (CON'T)

	Skill present prior to class		Date Achieved
12. Assemble equipment in working order			
Connect computer, monitor, disk drives	Yes ___	No ___	_____
Connect printer	Yes ___	No ___	_____
Connect other peripherals	Yes ___	No ___	_____
13. Diagnose simple hardware problems			
Use diagnostic software	Yes ___	No ___	_____
Do preventive disk drive maintenance	Yes ___	No ___	_____
Communicate with dealer's service department	Yes ___	No ___	_____
14. Diagnose and remedy simple software problems	Yes ___	No ___	_____
15. Perform Utility operations			
Make back-up disks	Yes ___	No ___	_____
Copy DOS or CPM files	Yes ___	No ___	_____
Large files	Yes ___	No ___	_____
Delete files	Yes ___	No ___	_____
Rename files	Yes ___	No ___	_____
Perform other housekeeping activities	Yes ___	No ___	_____
16. Write complex programs			
Use more sophisticated programming Languages than in 7	Yes ___	No ___	_____
Examples: Assembly Language	Yes ___	No ___	_____
Pascal	Yes ___	No ___	_____
Forth	Yes ___	No ___	_____
d-Base	Yes ___	No ___	_____
Others	Yes ___	No ___	_____
Use animated graphics if needed	Yes ___	No ___	_____
Use sound	Yes ___	No ___	_____
Program for peripheral use	Yes ___	No ___	_____
17. Customize programs for specific purposes	Yes ___	No ___	_____
18. Interface computer with non-computer devices	Yes ___	No ___	_____
19. Repair equipment			
Disassemble components	Ye ___	No ___	_____
Assemble components	Yes ___	No ___	_____
20. Develop computer systems	Yes ___	No ___	_____

COMPUTER USER COMPETENCIES FOR TEACHERS (CON'T)

	Skill Present Prior to Class	Date Achieved
21. Develop interfaces	Yes ___ No ___	_____
22. Use cross-assembler for assembly program for different CPUs	Yes ___ No ___	_____
23. Write language based on learning styles	Yes ___ No ___	_____
24. Use team approach in developing software	Yes ___ No ___	_____

Developed by
Project M.U.S.E.
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Western Illinois University
Macomb, Ilinois 61455

SIMULATION OF COMPUTER HARDWARE ACCESS OBSERVATION

The following handouts are designed to simulate the criteria, procedure and techniques that are used when a team observes, evaluates and recommends computer adaptive devices for a severely handicapped student.

For the purposes of this simulation, guidelines entitled "Suggested Criteria for the Selection of Computer Adaptive Devices for A Severely Handicapped Student" have been included for discussion.

The "Computer Hardware Access Observation" form can be used with the videotape "Sara", available from FDLRS/Alpha, Cedar Square Building, Suite 203, 2112 S. Congress Avenue, West Palm Beach, FL 33406, (305) 433-3500. SpecialNet: FDLRS16, or with any videotape of a severely physically involved student.

Workshop participants are asked to view the videotape and read through the "Computer Hardware Access Observation" checklist, marking appropriate responses and making notes as needed. Questions that arise during the videotape should also be noted on the form.

When all participants have had sufficient time to complete the observation checklist, discuss and compare results with the group.

Note the major cognitive skills listed on the observation checklist. These include:

- Auditory Perception
- Comprehension
- Developmental Level
- Keyboard Access
- Body Movement
- Cognitive Movement
- Visual Attention and Perception
- Adaptive Devices

Workshop participants should realize that although they are observing a videotape of a severely physically involved student, these skills are required of any student using computers. Skills relating to "Comprehension" and "Visual Attention and Perception" are particularly appropriate for many exceptional students.

SUGGESTED CRITERIA FOR THE SELECTION OF COMPUTER ADAPTIVE DEVICES FOR A SEVERELY HANDICAPPED STUDENT

It is significant that computer adaptive devices selected to assist a particular handicapped student be the most effective and most appropriate to maximize cognitive development while not causing physical discomfort, exhaustion or frustration. To help with the selection process, the following suggested criteria was developed for the Department of Exceptional Student Education in Palm Beach County by the staff at the Florida Diagnostic and Learning Resources System (FDLRS/Alpha).

To facilitate this process, nonvocal student referrals will be made to the Communication Systems Evaluation Center (CSEC) when appropriate.

A copy of the Criteria and Procedures for a referral to the Communication Systems Evaluation Center is available from the District CSEC contact person.

Criteria for Computer Adaptive Devices

1. Students who may benefit from specific computer adaptive devices and who do not meet the eligibility requirements for a CSEC evaluation.

2. Students who may benefit from specific computer adaptive devices but a CSEC evaluation is not timely.

3. Evaluation procedure will be monitored by a team that includes:

    a. Florida Diagnostic and Learning Resource System
       Diagnostic and Resource Specialist and
       Instructional Technology Specialist
    b. Physical Therapist
    c. Occupational Therapist
    d. Speech Teacher

with consultation from Warren Brown, FDLRS Associate Center, Sarasota, FL.

The following are guidelines to determine appropriate referrals:

1. The student must be in an Exceptional Student Education Program.

2. The evaluation procedure will not supplant services already available from CSEC.

3. The purpose of the evaluation procedure is to gather information required for the appropriate selection of a computer adaptive device that will facilitate access to the computer by a handicapped tudent.

4. The most appropriate device should be selected to maximize cognitive development while minimizing physical exc tion, exhaustion or frustration.

5. Referrals should be made to the Florida Diagnostic and Learning Resource System.

Handout #A-4b

Florida Diagnostic and Learning Resources System
FDLRS/Instructional Technology

COMPUTER HARDWARE ACCESS OBSERVATION

DRAFT

Date: _____

Student's name: _____
School: _____
Exceptionality: _____
Grade Level: _____ Cognitive Developmental Level _____
Date of Parent Permission: _____

Contact Person at School: _____
Contact Person's Title: _____

Check only those descriptors which are appropriate for a particular student.

AUDITORY PERCEPTION

responds to auditory stimuli _____
- normal conversational level _____
- discriminates sound from background _____

cannot make use of auditory stimuli _____

COMPREHENSION

can read and follow directions without assistance _____
- understands one (1) step directions _____
- understands two (2) step directions _____
- understands three (3) step directions _____

must have directions read verbally _____

- understands & follows verbal directions _____
  - one (1) step directions _____
  - two (2) step directions _____
  - three (3) step directions _____

- retains verbal directions _____

- needs constant assistance _____

can follow directions provided by a speech synthesizer _____

MOTOR SKILLS

DEVELOPMENTAL LEVEL

apedal (lies where placed) _____
rolls _____
sits unsupported when placed _____
sits supported _____
crawls _____
walks _____
tactile defensiveness _____

KEYBOARD ACCESS

bimanual typing skills (uses both hands for keyboarding) _____

can strike individual keys with 1 finger/T stick _____

hits two or more keys with one stroke _____

can make a clean hit on keys _____

causes rapid repeat of characters when striking keys _____

can strike two keys simultaneously (e.g., Control or Shift) _____

range of motion over the keyboard/enlarged keyboard _____

alternate method of striking keyboard (e.g., mouthstick) _____

endurance/stamina at keyboard _____

BODY MOVEMENT

ambulates independently/uses walker/wheelchair _____

has control of body movement _____

head control _____
holds head erect, mouth closed _____
throws head forward/backward/left/right _____

trunk control _____
holds trunk erect, head erect _____
body falls forward/left/right, thrusts backward _____

COGNITIVE MOVEMENT

upper extremity movements _____

purposeful _____

random _____
writhing movements _____
non-purposeful _____
rigid _____

positioning and equipment presently used by student _____

has voluntary reflexes that interfere with computer access _____

strong startle _____

if arm straightens, does head push back? _____

if arm bends, does head fall forward? _____

if head turns one way, is there an arm response? _____

others: _____

BODY POSITION AT THE COMPUTER

can sit comfortably at the computer _____

has to extend body or angle body to view screen/access input device _____

monitor must be moved into student's best visual field _____

VISUAL ATTENTION AND PERCEPTION

stays on task _____

occasionally distracted _____

easily distracted _____

needs constant intervention to stay on task _____

identifies shapes regardless of orientation or size _____

can visually close an incomplete shape _____

has adequate visual acuity _____

moves eyes separately from/only with head _____

has adequate visual field to see entire screen _____

horizontal tracking _____

vertical tracking _____

scanning pattern _____

localizing _____

can read screen _____

- 10 column _____
- 20 column _____
- 40 column _____
- 80 column _____

needs simple video/text _____

can read a "busy" screen _____

stationary vs. scrolling screen (speed of scroll) _____

ADAPTIVE DEVICES

student requires no adaptive devices _____

student may benefit from:

- speech synthesis _____
- joy stick _____
- mouse _____
- enlarged keyboard _____
- keyguard _____
- key board membrane (drool guard) _____
- voice recognition _____
- adaptive firmware card _____
  - type of switch _____
  - size of switch _____
  - part of body used to activate _____
    - head
    - mouth
    - upper extremity
    - trunk
    - lower extremity
  - amount of pressure needed to activate _____
    - light _____
    - moderate _____
    - heavy _____
  - placement of switch _____
  - number of responses/time needed to activate _____
  - accuracy _____
  - endurance _____
- dysfunction of rapid repeat feature _____
- assistance with two key strokes _____
- braille output _____
- enlarged print output _____

Name and Title of Observers

_____

_____

_____

_____

Location of Observation

_____

Type of Computer Used for Observation

_____

Comments:

SELECTING A COMPUTER FOR USE WITH EXCEPTIONAL STUDENTS

THE SCREENING PROCESS

1. What will we use our computers for? What tasks do we want it to perform?

2. What types of software will we need to purchase? Are there any particular packages we want? Are they "hardware specific"? Do any require special cards or devices to operate?

3. What peripherals and adaptive devices do we plan to purchase? Are any of them "hardware specific"? Do any of the require special cards to operate?

4. How much memory will we need for software and additional peripherals listed above?

5. What is our price range?

6. Which brands best meet the qualifications listed above?

SOURCE: Project RETOOL. "Microcomputer Applications in Special Education." A Training Manual for Special Education Teacher Educators Developed for the Teacher Education Division of the Council for Exceptional Children, 1984.

Checklist for Selection of Basic Computer Components

Every computer system must have basic components which can perform the functions of input, processing and output. Some form of external storage is required for most operations. There are different arrangements for packaging these components but all systems must have them. This checklist is intended to serve as an aid for those who need assistance in selecting components for purchase.

Computer -(Central Processing Unit (CPU) + Internal Memory)

This is the part that does the computing. Everything else is attached to it for putting information in, getting information out or storing information until it is needed for processing. Features to be considered include:

Memory — Check amount of advertised memory which will be in multiples of 16 K. Compare memory to that required to run selected software programs. Find out how much memory is actually available to the user (RAM).

Expandability — Find out if memory chips can be added to upgrade the unit if new programs or increased user level of sophistication requires it. Check if expansion will limit number of peripherals.

I/O Ports — Check number of ports available to connect peripherals. Find out if ports are dedicated to specific peripherals or may be flexibly assigned.

Languages — Find out which languages are built into the computer. See what other languages are available. (This is important if users will program or teach a language such as Logo.)

Peripherals — Check which input and output devices are compatible with the CPU. Find out which devices come with the system and which others are available.

Keyboard

Standard computer keyboards are similar to typewriter (QWERTY) keyboards. Some also have a 10-key calculator or numeric pad for easy entry of numeric data. Some have special function keys separate from typing keys. Features to consider include:

Sensitivity — What is the feel or action of the keyboard? How much pressure is required? Is this acceptable to the user?

Size — Are keys standard like most typewriters? Or are they smaller and farther apart, or flatter and sensitive, or membrane touch?

Portability — Is the keyboard detachable or permanently attached to the CPU?

Overlays — Are protective covers available to guard against spills or to assist students with fine motor problems?

Monitor

The monitor or cathode ray tube (CRT) displays output from the central processing unit on a screen. Some computers use a regular television set to display output. An RF modulator is usually required to accomplish this function and text may be difficult to read on the screen. Features to consider in choosing a monitor include:

Color — Is the display a standard monochrome with a black background and a green or amber display? If so, does this match with intended uses such as word processing, data base management or other applications which involve mainly text? Is color needed for graphics in educational software? What is the range and quality of color available?

Screen Size — What is the size of the display in columns and rows? If needed, will the size of the screen accommodate an 80 column display?

Graphics	What are the graphics capabilities? Are they low resolution (lo-res) which use blocks referenced by x,y coordinates, or high resolution (hi-res) which use dots or pixels? (The greater the number of pixels, the greater the clarity.)

External storage

Most computer systems require some form of external storage. Since tape drives are not recommended for classroom use, this checklist will consider only features of the disk drive.

Quantity	How many drives are needed for chosen applications? What is included with the system and what must be purchased separately?
Quality	If more than one drive model is available for the system, what is the difference in speed and capability compared to cost?
Flexibility	If there are two disk drives, may they be used independently and/or interchangeably?
Alternatives	Are other external storage systems available or desirable?

Printer (Optional)

Since many application programs such as word processing require a "hard copy" printout, the printer is a common output device frequently purchased with the basic computer system. Features to consider are:

Compatibility	Find out if the printer will work with the selected printer and software. (Insist on a demonstration.)
Print Quality	Is the quality of the printed copy suitable for the user's needs? (Insist on a demonstration.)
Carriage Width	Is the width of the carriage suitable for the user's needs?

Speed	Is the speed of the printer suitable for the tasks to be performed? (Insist on a demonstration.)
Fonts	What kind of print styles are available? Can fonts be changed within a document?
Graphics	Will this printer do graphics? (Important for programs like "The Print Shop") Are any special add-ons required to do graphics with this printer and the selected computer?
Noise	Is the noise level acceptable for the user's needs? (Insist on a demonstration.)
Ease of Use	How easy is it to change the ribbon, load the paper or remove the roller if labels get jammed?
Practicality	What kind of ribbons does this printer use? How long will they last? Who sells them? What do they cost? Are colored ribbons available?

APPLIED TECHNOLOGY RESOURCE MATERIALS LIST

The following materials are available at each of the 18 FDLRS Associate Centers. Most of the materials were provided to the Centers in conjunction with the Summer Institute on Applied Technology for Physically/Visually Impaired held in Merritt Island, August 6-9, 1985.

Contact your local FDLRS Center to review the material.

APPLIED TECHNOLOGY FOR PHYSICALLY/VISUALLY IMPAIRED: SUMMER INSTITUTE NOTEBOOK. (Includes selected journal articles and bibliographies from the resource listing.)

ALTERNATIVE COMMUNICATION SYSTEMS FOR NON-VOCAL STUDENTS, VOLUME III-E, 1982. Bureau of Education for Exceptional Students, State of Florida, Department of Education, Knott Building, Tallahassee, FL 32301.

CLOSING THE GAP: COMPUTERS FOR THE HANDICAPPED Journal publication.

COMPUTER ASSISTED INSTRUCTION AND SUPPORT FOR THE HANDICAPPED: INTERIM REPORT, VOLUME III-I. Bureau of Education for Exceptional Students, State of Florida, Department of Education, Knott Building, Tallahassee, FL 32301.

COMPUTER ASSISTED INSTRUCTION AND SUPPORT FOR THE HANDICAPPED: FINAL REPORT, VOLUME III-I. Bureau of Education for Exceptional Students, State of Florida, Department of Education, Knott Building, Tallahassee, FL 32301.

COMPUTER ASSISTED INSTRUCTION AND SUPPORT FOR THE HANDICAPPED: TRAINING PACKAGE, VOLUME III-I. Bureau of Education for Exceptional Students, State of Florida, Department of Education, Knott Building, Tallahassee, FL 32301.

COMPUTER EQUIPMENT AND AIDS FOR THE BLIND AND VISUALLY IMPAIRED. Baruch College, Computer Center for the Visually Impaired, 17 Lexington Avenue, Box 515, New York, NY 10010.

COMPUTER TECHNOLOGY FOR THE HANDICAPPED IN SPECIAL EDUCATION AND REHABILITATION: A RESOURCE GUIDE. 1983. By Gary Nave, Philip Browning and Jeri Carter. International Council for Computers in Education, University of Oregon, Eugene, OR 97403.

COMPUTER TECHNOLOGY FOR THE HANDICAPPED. THE PROCEEDINGS OF THE 1984 CLOSING THE GAP CONFERENCE, 1985. By Michael Gergen and Dolores Hagen. Closing the Gap, P.O. Box 68, Henderson, MN 56044.

COMPUTERS, EDUCATION AND SPECIAL NEEDS. 1984. By E. Paul Goldenberg, Susan Jo Russell and Cynthia J. Carter. Addison-Wesley Publishing Company Inc., Jacob Way, Reading, MA 01867.

DEVELOPMENTAL PHYSICAL MANAGEMENT FOR THE MULTI-DISABLED CHILD. By Beverly Buttram and Glenna Brown. University of Alabama, Area of Special Education, P.O. Box 2592, University, AL 35486.

DIRECTORY OF SERVICES AND SPECIALIZED EQUIPMENT FOR THE PHYSICALLY IMPAIRED. IBM-NAD, Monroe Towers, 8th Floor, 101 N. Monroe Street, Tallahassee, FL 32301.

EDUCATIONAL SOFTWARE DIRECTORY FOR THE IBM PERSONAL COMPUTERS, Winter/Spring 1985. Electronic Communications, Inc. Suite 220, 1311 Executive Center Drive, Tallahassee, FL 32301.

ELECTRONIC COMMUNICATION DEVICES FOR VISUALLY IMPAIRED STUDENTS, VOLUME III-F, 1982. Bureau of Education for Exceptional Students, State of Florida, Department of Education, Knott Building, Tallahassee, FL 32301.

ELECTRONIC COMMUNICATION DEVICES FOR VISUALLY IMPAIRED STUDENTS, 1982. PART 2: COMPUTER ACCESSIBILITY FOR THE VISUALLY IMPAIRED, VOLUME III-F, June 1983. Bureau of Education for Exceptional Students, State of Florida, Department of Education, Knott Building, Tallahassee, FL 32301.

GUIDE TO LEARNING. IBM-NAD, Monroe Towers, 8th Floor, 101 N. Monroe Street, Tallahasee, FL 32301.

HANDBOOK OF MICROCOMPUTER APPLICATIONS IN COMMUNICATION DISORDERS, 1984. Edited by Arthur H. Schwartz, College-Hill Press, Inc. 4284 41st Street, San Diego, CA 92105.

HANDBOOK OF MICROCOMPUTERS IN SPECIAL EDUCATION, 1984. By Michael Behrmann. College-Hill Press, Inc., 4284 41st Street, San Diego, CA 92105.

MICROCOMPUTERS IN EDUCATION - SPECIAL ISSUE: THE TOP 50 EDUCATIONAL SOFTWARE PUBLISHERS - 1984. John Mongillo, 2537 Post Road, Darien, CT 06820.

MICROCOMPUTERS IN SPECIAL EDUCATION. 1983. By Florence M. Taber. The Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091-1589.

MICROCOMPUTERS IN THE SCHOOLS - IMPLEMENTATION IN SPECIAL EDUCATION: CASE STUDY REPORT. 1983. SRA Technologies, 901 S. Highland Street, Arlington, VA 22204.

NON-VOCAL COMMUNICATION RESOURCE BOOK, 1985, Revised Edition. University of Wisconsin, TRACE Center, 314 Waisman Center, 1500 Highland Avenue, Madison, WI 53706.

ONLY THE BEST: THE DISCRIMINATING SOFTWARE GUIDE FOR PRESCHOOL-GRADE 12. 1985. By Linda L. Mattas. Education News Service, 926 J Street, Suite 212, Sacramento, CA 95814.

PERSONAL COMPUTERS AND SPECIAL NEEDS, 1984. By Frank G. Bowe. SYBEX Inc., 2344 Sixth Street, Berkeley, CA 94710.

PERSONAL COMPUTERS AND THE DISABLED, 1984. By Peter A. McWilliams. Doubleday Publishing Company, 501 Franklin Avenue, Garden City, NY 11530.

PROCEDURES FOR AN INTERDISCIPLINARY EVALUATION OF NONORAL STUDENTS, VOLUME III-M, April 1985. Bureau of Education for Exceptional Students, State of Florida, Department of Education, Knott Building, Tallahassee, FL 32301.

RESOURCE LIST: COMPUTERS AND VISUALLY IMPAIRED PERSONS, June 23, 1985. The Berthold Lowenfeld Seminar, AER Southwest Regional Convention.

SECOND BEGINNER'S GUIDE TO PERSONAL COMPUTERS FOR THE BLIND AND VISUALLY IMPAIRED. By the National Braille Press Inc., Brookline Books, P.O. Box 1046, 460 Broadway, Cambridge, MA 02238.

SPECIAL TECHNOLOGY FOR SPECIAL CHILDREN: COMPUTERS TO SERVE COMMUNICATION AND AUTONOMY IN THE EDUCATION OF HANDICAPPED CHILDREN, 1979. By E. Paul Goldenberg. Pro-Ed, 5341 Industrial Oak Blvd., Austin, TX 78735.

TECHNOLOGY AIDS AND INFORMATION RESOURCE GUIDE. Edited by Rick Lupacchino. State of Florida, Department of Health and Rehabilitative Services, Developmental Services Program Office and Florida Developmental Disabilities Planning Council, 1317 Winewood Blvd., Building 5, Room 210, Tallahassee, FL 32301.

TECHNOLOGY FOR INDEPENDENT LIVING, 1983. Compiled and edited by Sandi Enders. Rehabilitation Engineering Society of North America, 1101 Connecticut Avenue, Northwest, Suite 700, Washington D.C. 20036.

TESS, THE EDUCATIONAL SOFTWARE SELECTOR. EPIE Institute and Teachers College Press, 1985.

101 ACTIVITIES FOR COMPUTER CLASSES. Minnesota Educational Computing Consortium, 1983.

100 EXCEPTIONAL IDEAS FOR INTEGRATING COMPUTERS IN THE CLASSROOM. 1985. Edited by Razia Pullen. Florida Diagnostic and Learning Resources System Instructional Technology Network.

Name:

I will write my papers very neatly and I will not make any mistakes.

Copy the information on Handout #A-7 exactly. Be sure to use your VERY BEST penmandship following the directions given to you by the Instructor.

ADAPTING COMPUTER INPUT / OUTPUT

A computer system takes information in through some form of input. → The computer then processes the information or changes it as instructed to do by a program (software). → The computer gives some form of output to the user.

Input Devices

The keyboard is the usual way of input for the computer. However, if a child is unable to use the keyboard, other devices may be needed. Some alternate devices for computer input are:

- Joysticks & Games Paddles - handles, levers, or buttons which give input
- Adaptive Switches - specially designed switches for severely physically impaired
- Koala Pad and Power Pad - touch sensitive pad or tablet; a stylus or finger on the surface gives input
- Muppet Learning Keys - large alternate keyboard for young children
- Light Pen - a special pen that gives input to the computer when it touches the screen
- Mouse - a box-like device that controls cursor movement when rolled on flat surface
- Voice Recognition System - a microphone that allows user to control the computer with voice
- Unicorn Board - a touch sensitive board that can be designed to provide the user with larger keys; may be designed as a communication board with appropriate software
- Touch Window - a touch sensitive transparent screen which covers the computer monitor; a finger touching the surface gives input.

Output Devices

The most common output device is the monitor or T.V. screen which gives visual display. Another common output device is the printer which produces a printed copy as output. Children who cannot see the print on a monitor or the printer copy, may need some form of alternate output. Some devices for alternate output are:

- Speech Synthesizer - gives output similar to the human voice
- Large Print CRT - a special screen for visually impaired; print is magnified
- Cassette Control Device - device to activate a tape recorder which is synchronized with the computer to give oral instructions
- Braille Printer - specially designed printer that gives output in Braille for the blind
- Modem - This device can provide both input and output over the phone line, allowing one computer to communicate with another. A modem is especially important to the deaf as it provides a way to communicate over the phone.

HARDWARE CONSIDERATIONS

1. What will the computer be used for?

2. What types of software do we want? Are there any particular packages we want? Are they "hardware specific"?

3. What peripherals and adaptive devices do we plan to purchase? Are any of these "hardware specific"?

4. How much memory do we need for software and peripherals?

5. What is our price range?

6. Which brands best meet the qualifications listed above?

VARIATIONS OF INPUT INTERFACE

Keyboard based
- Keyboard
- Assisted keyboard
- Keyboard with keyguard
- Programmed keyboard (by software or hardware)
- Programmed detachable, re-positioned keyboard
- Programmed keyboard with keyguard
- Programmed detachable, re-positioned keyboard with keyguard
- Condensed keyboard
- Condensed switches for coding
- Condensed detachable, re-positioned keyboard
- Condensed detachable, re-positioned keyboard with keyguard
- Expanded keyboard
- Expanded keyboard programmed for delay
- Expanded keyboard programmed for messages
- Expanded keyboard programmed for key size
- Dedicated communication devices with contact activated keys
- Dedicated communication devices with no-contact, infra red activated keys
- Voice input assisted keyboard with:
  - messaging
  - encoding
- Keyboard input in any of above made with Speech Input Supplement

Switch based
- Multiple switches acting as condensed keyboard
- Single switch with Morse code*
- Single switch with Morse code and messaging
- Dual switch with Morse code
- Dual switch with Morse code and messaging
- Single switch with scanning
- Single switch with customized scanning
- Dual switch with scanning
- Dual switch with customized scanning
- Single switch with step scanning
- Single switch with customized step scanning
- Dual switch with step scanning
- Dual switch with customized step scanning
- Single switch with inverse scanning
- Single switch with customized inverse scanning
- Dual switch with inverse scanning
- Dual switch with customized inverse scanning

Voice based
- Total Voice input (single character entry)
- Voice input with messaging
- Voice entry with keyboard supplement (see Keyboard Based)

*or other appropriate coding systems

MICROCOMPUTER HARDWARE COMPONENTS INFORMATION SHEET

COMPONENT/FEATURE	BRANDS 1	2	3	4	5
Base Price					
CPU - Memory					
Expandable					
Extra Cost					
Built in Language					
Other Language					
I/O Ports					
Keyboard -					
Type of Keys					
Calculator Pad					
Special Function Keys					
Key Action					
Monitor -					
Monochrome					
Color					
Other (RGB, LCD)					
Row/Column Dimensions					
Upper/Lower Case					
Display Size					
Lo-Res Graphics and Colors					
Hi-Res Graphics and Colors					

COMPONENT/FEATURE	BRANDS 1	2	3	4	5
Storage -					
Cartridge or Data-Pack					
Cassette Deck					
Floppy Disk Drive					
Additional Floppy Drive					
Hard Disk					
Peripherals -					
Modem					
Built in					
Direct-Connect					
Acoustic Coupler					
Paddles					
Joysticks					
Trak-Ball					
Mouse					
Graphics Tablet					
Light Pen					

FEATURES					
Printer - = Speed in cps					
Dot matrix or letter quality					
Changeable typeface or fonts					
Impact, non-impact, or thermal					
Carriage width					
Type of paper needed					
Tractor feed or sheet feeder					
Graphics capabilities					
Cost					

Assistive and Augmentative Devices

This list represents some of the vendors who offer devices and mechanical equipment that minimizes the effect of a handicap or limitation in performing a particular task or activity. The Trace Center has published the International Software/Hardware Registry and The Non-Vocal Communication Resource Book which are excellent sources for information on assistive and augmentative devices.

1. ADAPTIVE PERIPHERALS
   4529 BAGLEY AVE. N.
   SEATTLE, WA 98103

   Manufactures specialized adaptive interfaces and devices

2. ADAPTIVE TECHNOLOGY
   5334 72nd CIRCLE NORTH
   BROOKLYN CENTER, MN 55429

   Provides an inexpensive Apple template with the option of purchasing keylocks that screw into the templates.

3. COMPUTERS FOR THE PHYSICALLY HANDICAPPED, INC.
   7602 TALBERT AVENUE
   HUNTINGTON BEACH, CA 92647

   Customizes computers for the physically handicapped, including synthesized speech.

4. DUNAMIS. INC.
   3620 Highway 317
   Suwanee, Georgia 30174
   (404) 932-0485

   Provides handware and software support for the PowerPad. Also has the EZ Port II available for Apple.

5. LYBEN COMPUTER SYSTEMS
   1250 E. RANKIN DRIVE
   TROY, MI 48083
   (313) 589-3440

   Has membrane or safe skin available for Apple.

6. PRENTKE ROMICH COMPANY
   513 TOWNSHIP ROAD
   SHREVE, OH 44676

   Produces adaptive equipment to modify computers.

7. ROCKY MOUNTAIN SOFTWARE
   214-131 WATER STREET
   VANCOUVER, B.C. V6B4M3

   Manufactures software aids for the handicapped, including the Handicapped Typewriter, a software system for the Apple II.

8. SCOTT, FORESMAN AND COMPANY
   ELECTRONIC PUBLISHING
   1900 EAST LAKE AVENUE
   GLENVIEW, IL 60025

   Produces Speak and Read, a talking electronic learning aid.

9. SCOTT INSTRUMENTS
   1111 WILLOW SPRINGS DRIVE
   DENTON, TX 76201

   Offers the Voice Based Learning Systems (VBLS), the first computer assisted instruction with voice entry for the Apple II.

10. SUNBURST COMMUNICATIONS
    ROOM DL7
    39 WASHINGTON AVENUE
    PLEASANTVILLE, NY 10570-9971

    Provides hardware and software support for the Muppet Keyboard and the Touch Window.

11. TELESENSORY SYSTEMS, INC.
    3408 HILLVIEW AVENUE
    P.O. BOX 10099
    PALO ALTO, CA 94304

    Offers assistive devices for the visually impaired and deaf-blind, the Optacon and Versa Braille.

12. TEXAS INSTRUMENTS
    P.O. BOX 225012
    MS/54
    DALLAS, TX 75265

    Manufactures Vocaid, a touch and tell education aid, Speak and Spell, and Speak and Math.

13. THE ALIEN GROUP
    27 WEST 23RD STREET
    NEW YORK, NY 10010

    Offers the Voice Box, a low cost, unlimited vocabulary, programmable speech synthesizer for the Apple and Atari.

14. V-TEK
    1625 OLYMPIC BLVD.
    SANTA MONICA, CA 90404

    Manufactures and distributes a wide range of technology which assists visually impaired.

15. WESTERN CENTER FOR MICROCOMPUTERS IN SPECIAL EDUCATION
    SUITE 275
    1259 EL CAMINO REAL
    MENLO PARK, CA 94025

    Offers the Echo II Speech Synthesizer with volume control and earphones.

16. ZYGO INDUSTRIES, INC.
    P.O. BOX 1008
    PORTLAND, OR 97207

    Distributor of a wide range of assistive devices including page turners, overbed tables, operating controls, communications board, and eye-transfer communicator.

Accessing the Keyboard

Enclosed is a sample of the Apple keyboard. The right and left hands are also illustrated. On each finger are written the keys that should be typed by the corresponding finger.

To help make the keyboard more accessible to early learners or to students with visual discrimination difficulties, there are a number of activities that can be done.

1. Prepare a copy of a blank computer keyboard. Have the students fill in the keys using a computer keyboard for reference.

2. Have students color the keyboards using the following format:

   A. Yellow Keys: R, T, Y, U, F, G, H, J, V, B, N, M
   B. Green Keys: E, D, C, I, K, comma
   C. Orange Keys: W, S, X, O, L, period
   D. Blue Keys: Q, A, Z, P, semicolon, question mark

3. In place of colored dot stickers, you can use small animated stickers such as birds, flowers, etc., to highlight select keys that are used frequently, e.g., RETURN, SPACE BAR, SHIFT, home row.

4. Prepare sentence strips to use when teaching touch typing, color coding them to correspond to the colored key pattern above:

A.	A S D F : L K J	(Home Row - Color Mix)
B.	FGF FTF FBF FRF FVF	(Yellow Row - Left Hand)
C.	JHJ JYJ JNJ JUJ JMJ	(Yellow Row - Right Hand)
D.	DED DCD DED DCD	(Green Row - Left Hand)
E.	KIK K, K KIK K, K	(Green Row - Right Hand)
F.	SWS SXS SWS SXS	(Orange Row - Left Hand)
G.	LOL L.L LOL L.L	(Orange Row - Right Hand)
H.	AQA AZA AQA AZA	(Blue Row - Left Hand)
I.	;P; ;?; ;P; ;?;	(Blue Row - Right Hand)

5. Using colored string tied on the corresponding finger for each key placement, have students practice the individual touch typing sequences using their colored keyboards and the sentence strips. Students should say the letter sequences to themselves while typing, to assist in more comprehensive learning.

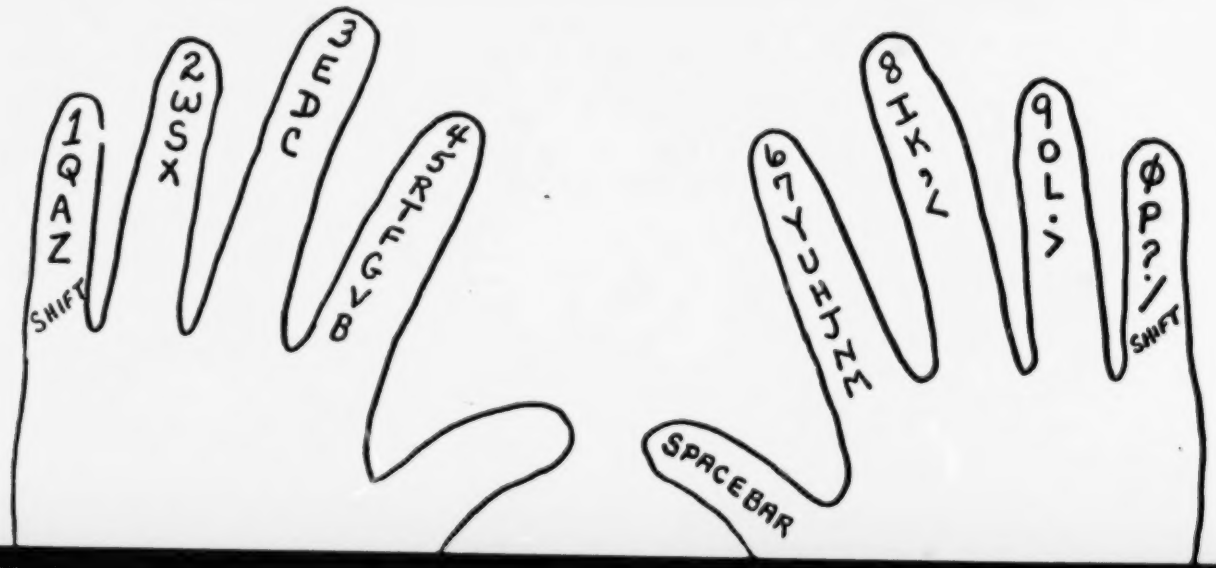
Accessing the Keyboard

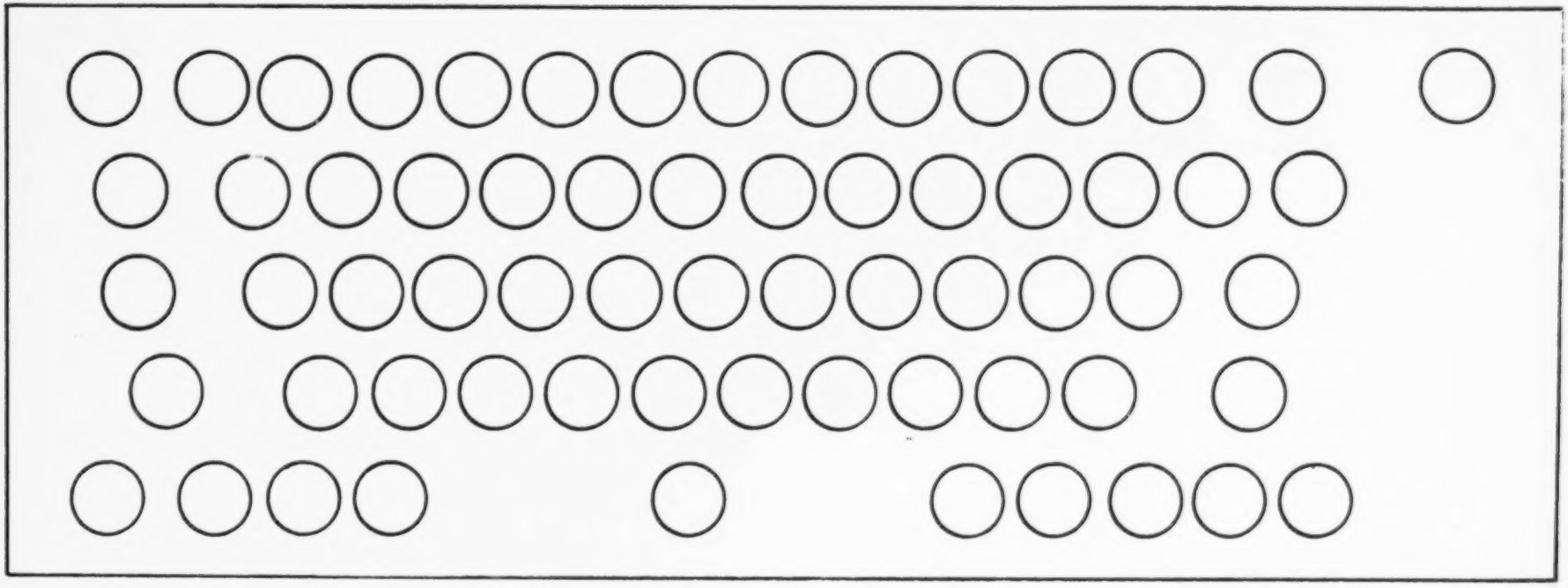
6. A variation of the color-coded keyboard is to use washable, acrylic paint to color-code each finger or washable magic markers.

7. When students feel comfortable with the typing sequences, move them to a computer for practice. The sentence strips can be placed just above the keyboard for a reference point, and the individual keys can be marked with small colored dots.

8. Order an inexpensive customized template with select keys exposed.

APPLE IIe KEYBOARD





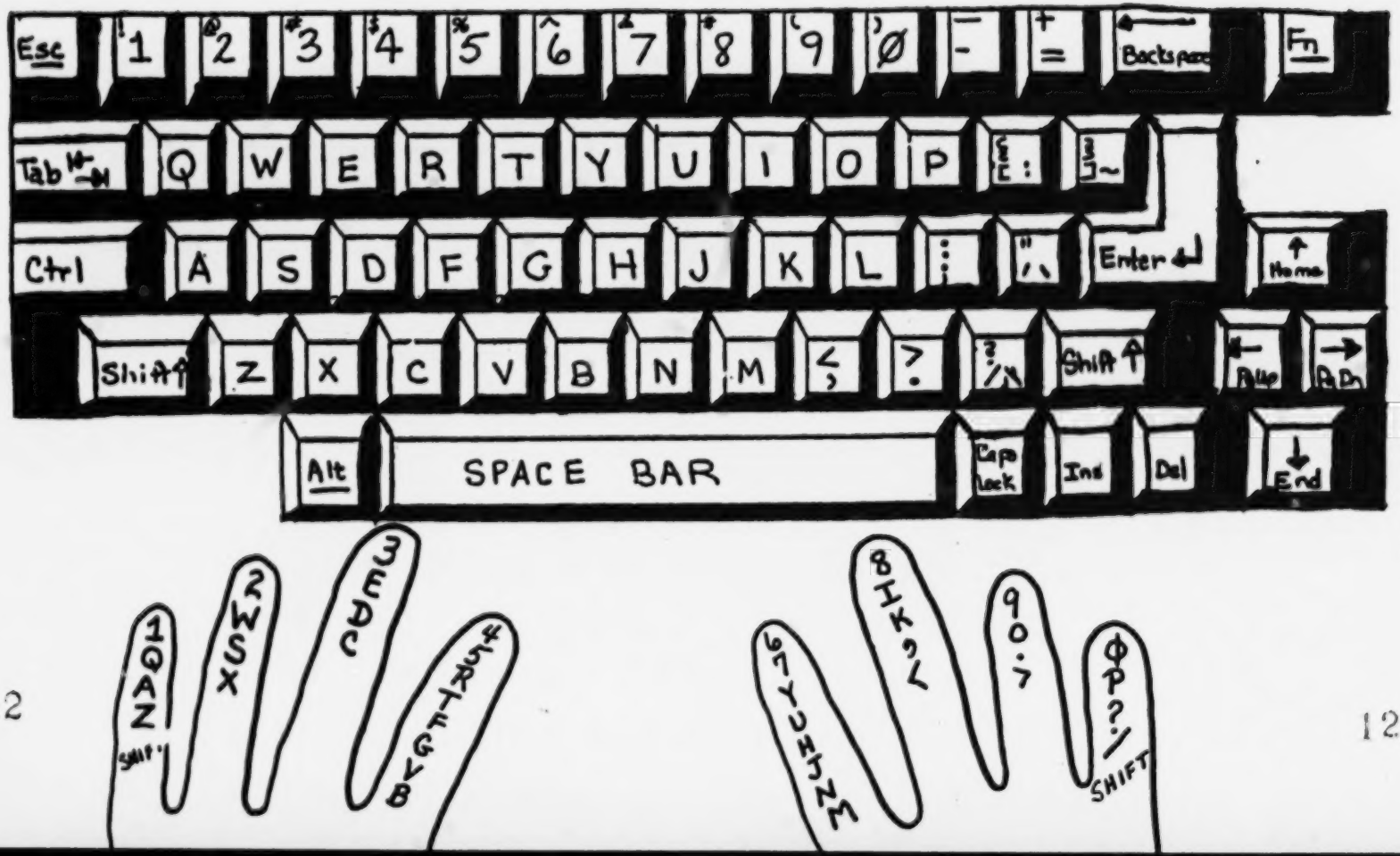
APPLE IIe COMPUTER KEYBOARD TEMPLATE

1. Cut out all or select circles to make a paper template that fits over the Apple IIe keyboard (Refer to Handout #B-3b).

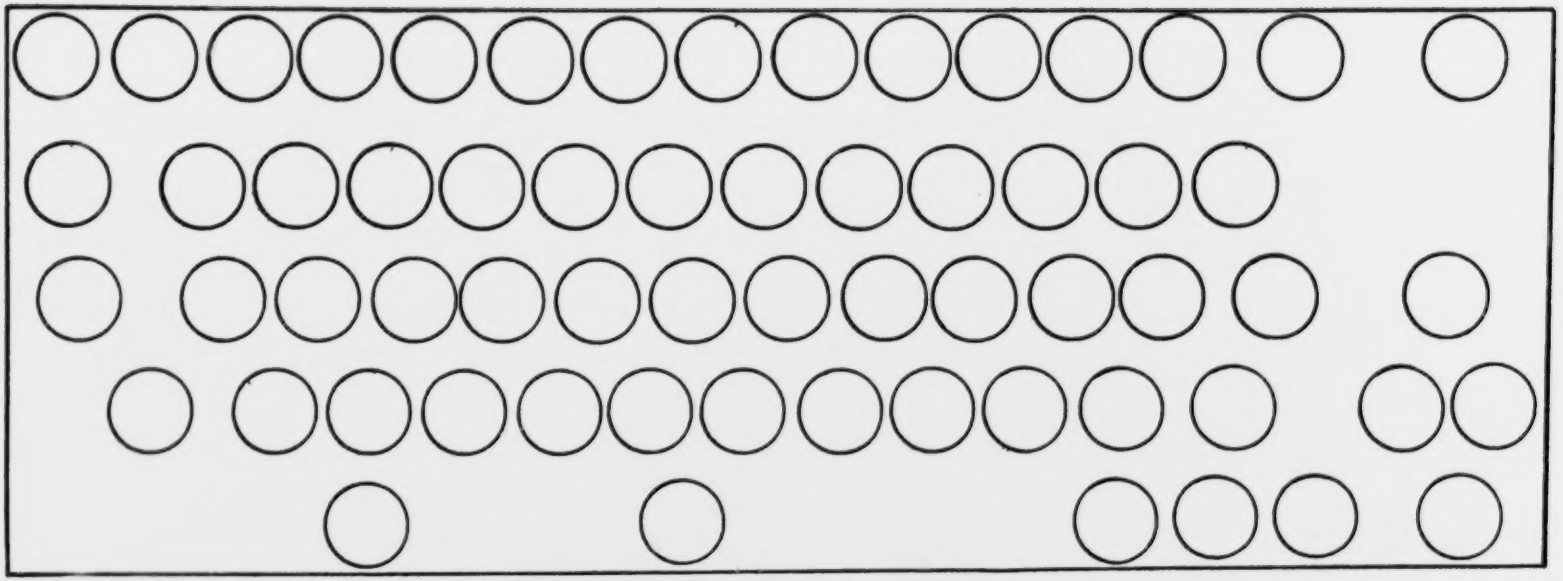
2. Use the practice template with students who demonstrate visual discrimination difficulties.

Handout #B-3c

IBM PC JR



Handout #B-3d



IBM PCjr COMPUTER KEYBOARD TEMPLATE

1. Cut out all or select circles to make a paper template that fits over the IBM PCjr keyboard. (Refer to Handout #B-3d).
2. Use the practice template with students who demonstrate visual discrimination difficulties.

GLOSSARY OF COMPUTER PERIPHERALS

Information was compiled from A Resource Manual for the Development and Evaluation of Special Programs for Exceptional Students, Volume III-E, Alternative Communication Systems for Non-Vocal Students and from Project RETOOL Module V-Hardware Evaluation by Janet Kitchener Eisenbarth, and Non-Vocal Communication Resource Book by Gregg C. Vanderheiden, University Park Press, 1978.

Abilityphone - This stand-alone device stores up to six emergency phone numbers and automatically dials them in sequence when a single key is actuated. It has vocal output, 32 character message display, alarm clock, calculator, environment controller, calendar, automatic answering, and repeat dialing feature. (Basic Telecommunications Corporation)

Adaptive Firmware Card - Card for Apple II family enabling standard software to be run by use of input devices. (Adaptive Peripherals)

Alpha Menu - User can select letters, numbers, and punctuation marks through scanning to construct sentences. Variety of input methods can be used. For the Apple II+ and Apple IIe. (Bill James)

Autocom (Automonitoring Communication Board) - This is a self-contained communication aid which displays pre-programmed words, phrases and sentences on a built-in printer. It can be mounted to a wheelchair. It can also function as an input or control device when interfaced with an Apple. (Prentke Romich Company)

Blissymbols Scanner - Permits a person who can activate a control switch to select, by means of row-column scanning, any of the locations on the 512 vocabulary. (Prentke Romich Company)

Computer Assisted Communication System (CAC) - The system is composed of the following parts: a) an oversized keyboard-type interface consisting of a standard set of typewriter keys and several specialized computer control keys; b) a telecomputer digilog model 109 for usage with a time share service computer and/or; c) an on site SLI-11 minicomputer with two floppy disks; and d) a television display unit. (Telephone Pioneer, Bell Telephone Laboratories)

C2E2 (Communication, Control, Education, and Entertainment) - This circuit board when connected to an Apple, is used for environmental control, word processing (with a voice input device), telecommunications, and execution of standard software. (Serota Engineering Consultants)

Cognivox V10-1003 - This is a voice recognition and voice output system for the Apple II. It is actually a speech digitizer rather than a synthesizer. (Voicetek)

GLOSSARY OF COMPUTER PERIPHERALS (Continued)

Cypertalker 2 - A speech adapter capable of adding verbal output to many computer systems, this can also run a large percentage of standard Apple software. (Cyberon Corporation)

ECHO II Speech Synthesizer - Speech can be added to word processing programs by inserting print commands in the documents. (Street Electronics Corp.)

EKEG Expanded Keyboards - These are keyboards designed for individuals with physical handicaps. They are simplified, easy-to-read boards that attach to the Apple simply by a cable. (EKEG Electronics Co.)

EKEG Remote Keyboards - Similar to the EKEG Expanded Keyboards, these are better suited for persons unable to use a standard keyboard. Joystick and push buttons are included. For the Apple. (EKEG Electronics Corp.)

ETF (Electric Typing Fingers) - This device attaches to a Model D Braille typewriter. It accepts signals from an Apple and in turn activates appropriate keys to produce a Braille "hard copy". (Personal Micro Computers, Inc.)

Express I - A microprocessor based electronic communication device. It is portable and battery-operated. It features scanning, encoding or direct selection modes. (Prentke Romich Company)

Express 3 (plus Wireless Data Transmitter/Receiver) - This communication aid provides written and verbal output of pre-programmed words, phrases and sentences. A wireless interface is available for the Apple enabling the user to enter data and control the computer from remote locations within the home or work environment. (Prentke Romich Company)

Eyebrow wrinkle switch - This on/off switching device attaches to a headband. The switch rests just above the eyebrow and is actuated by raising of the eyebrow. Attaches to wheelchair. (Prentke Romich Company)

Finger Splints - Enables users without enough muscle control in their fingers to manipulate a keyboard to operate the keyboard with the hand in a functional position.

Georgia Tech Driving Simulator - This is used to prepare handicapped persons for actual driving experiences. Built around an Apple II, it is controlled by a joystick and keypad in combination. (Research Services, Atlanta VA Med. Ctr.)

Handiterm - This 10-key board enables the user to select letters, numbers, punctuation and words from a matrix on an Apple video display. By specifying row and column coordinates, the user can spell words and construct sentences. Control of peripherals and separate household appliances is also possible. (John Giem)

GLOSSARY OF COMPUTER PERIPHERALS (Continued)

Handivoice 110 - A portable, battery-operated, electronic speech synthesizer. It has a preprogrammed vocabulary that includes 473 words, sounds and phrases. The vocabulary and operating modes are arranged in four levels which are accessed through 128 touch-sensitive squares. The Handivoice allows the user to create a message and play it back. (H. C. Electronics, Inc.)

Keyguards - These covers fit over computer keyboards, and holes allow for guided access to each key through use of finger, mouth stick or head pointer. For the Apple. (Prentke Romich Company)

Kurzweil Reading Machine - Converts books, magazines, letters, reports or any ordinary printed material, into spoken English. The system reads several hundred styles and most sizes of type. Present cost is $26,000. (Kurzweil Computer Products, Inc.)

MCM/D - A compact telephone communications unit consisting of a keyboard, correctable 32 character readout, acoustic phone coupler, rechargeable battery pack, and the necessary control electronics, all housed in a durable plastic case. It is compatible with all deaf tele-communications equipment. (Micon Industries)

MicroCommunicator - User-defined sentences are actuated by a single keystroke and visually displayed. Some sound effects can be produced. Available for the Apple II family. May be modified for speech and print output. (Grover & Associates)

Miniaturized Computers - Used for development of artificial hearing for deaf people who cannot be helped by conventional hearing aids. Minicomputers will stimulate the inner ear so that deaf people can recognize tones by stimulated electrodes.

Minispeak - This is a self-contained keyboard device with voice synthesizer, LCD readout, and printer. Minimum key actuations generate unlimited user-defined sentences. Can also output in ASCII to interface with microcomputers (Apple). Two embodiments - touch sensitive or light scan panels. (Prentke Romich Company)

MOD (Mouth Operated Dynamic) Keyboard System - This keyboard appears on a Commodore VIC-20 monitor. Switches direct the cursor to select desired characters, words, and commands. When interfaced with an Apple II, the keyboard can control and run standard Apple software. (Tash, Inc.)

Modified Perkins Brailler - The original Perkins Brailler is a stand-alone Braille Embosser. This modified version interfaces with the Apple II to receive input or generate output in Braille. (Maryland Computer Services, Inc.)

GLOSSARY OF COMPUTER PERIPHERALS (Continued)

Motor-Handicapped Support System - This voice recognition system allows user to control a microcomputer, peripherals, and special purpose devices. Currently available for Heath/Zenith; planning to expand to TRS and Apple. (Artra Inc.)

N. U. Communication and Device Controller - Create, edit, save, print, and transmit text by using switch input. Apple II compatible. (Prentke Romich Company)

Optacon - This two-part print-reading system picks up visual images from any printed materials or CRT and translates them into tactile images. Thus visually impaired persons can "read" material in forms other than Braille. No interface required. (Telesensory Systems, Inc.)

PC-1 Powerline Controller - A remote environmental control device for operating electrical appliances. (BI-COMM Systems)

R/M Systems 3100 Compudapter - Numbers, letters, words and control signals are displayed on a grid and selected by touch-control switches. This device enables the severely disabled user to use any Apple II. (R/M Systems, Inc.)

ScanWriter - This is a portable communication system which stores user-defined messages activated by a minimum of keystrokes. It can perform any function normally done on an Apple keyboard. (Zygo Industries, Inc.)

Sip and Puff - On/off switching device controlled by inhaling or exhaling a very small amount of air through the mouth. Attaches to wheelchair. (Prentke Romich Company)

Sweet Talker - This voice synthesizer adds speech to programs by programming of individual phonemes. For the Apple II (Micromint, Inc.)

Tactile Graphic Display - This device is a matrix of pins that are raised and lowered by computer. Graphs and charts normally only visible on a CRT screen are "readable" by touch. Text can also be displayed in this manner. (American Foundation for the Blind)

Telephone for the Deaf - Computerized device attached to standard telephones to permit easy, effective telephone communication by hearing and speech impaired. A calculator-like keyboard lets users "punch-in" messages with fingers rather than speak and read messages off a screen. (Audiobionice)

TetraScan and TETRAscan II - These keyboard-type devices have LED panels corresponding to characters and special function keys. Activated by means of special input switches, they can interface with a CPU. For the Apple II. (Zygo Industries, Inc.)

GLOSSARY OF COMPUTER PERIPHERALS (Continued)

Text-Writing, Speaking and Appliance Control - This device can control an Apple II and several peripherals, household appliances, and a telephone. A single button switch controls a cursor that continuously scans a menu on a CRT. (University of Illinois at Urbana, School of Chemical Science)

Touch Sensitive Tablets - Different size pads allow user to input selections to the computer by touching a pad surface. Examples include the Koala Pad and Power Pad which interface with the Apple II series.

Type N' Talk - This is a versatile speech synthesizer that pronounces and spells words, and communicates with other computers. User can change phonemes to alter pronunciation of words. (Votrax Division of Federal Screworks)

VersaBraille - This word processing system stores Braille on cassette tapes and allows the user to edit, add and delete without rebrailling entire documents. (Telesensory Systems, Inc.)

VERT - This extremely versatile verbal word processing system includes many sophisticated features such as cursor location, searches, spelling verification, word/line review, and variable speech rate. For the IBM family of personal computers and mainframe terminals (Telesensory Systems, Inc.)

VIM (Voice Input Module) - Through voice recognition, this device converts spoken words into commands to operate any Apple II. It allows for total control of the micro without the use of a keyboard. (Voice Machine Communications, Inc.)

VISUALTEK Large Print Display Processor - A plug-in peripheral for the Apple II, the large print display processor enlarges dot matrix letters up to 16 times their original size. Dials control size of characters and brightness of screen. Most software can be run without alteration. Present cost of $52,500. (VISUALTEX)

Wobble Switch - This on/off switching device is controlled by a small movement in any direction. It can be activated by chin, wrist, elbow, knee, or any other body part with controlled movement. Attaches to wheelchair. (Prentke Romich Company)

ZYGO Model 100 Communication System - Row/column scanning accesses over 100 messages to aid nonvocal persons in communicating visually with others. With an interface card, the Model 100 can operate any Apple II and run standard software. (Zygo Industries, Inc.)

GLOSSARY OF COMPUTER PERIPHERALS (Continued)

ZYGO Switches - A wide variety of switches are available from Zygo which can interface with an Apple IIe computer for scanning input. Switches include:

- Tread switch - activated by depressing treadle
- Touch switch - activated by depressing touch plate
- Leaf switch - activated by deflection of leaf
- Rocking lever - activated by depressing plate which may be single or dual action
- Pneumatic switch - activated by increasing air pressure at high port or decreasing pressure at low port
- Tongue switch - activated by deflecting a toggle switch
- Wobble switch - activated by gross movement
- Chin switch - activated by depressing touch plate
- Joy stick - activated by deflection or control rod
- Arm slot control - Activated by depressing paddle switches
- Multi-Directional Reed Switches - activated by magnet

Questions to Ask When Purchasing a Speech Synthesizer

1. How much can we afford to invest in a speech synthesizer?

2. What do we need the speech synthesizer to do?

3. Is the speech synthesizer composed of software, hardware, or both?

4. Is there any additional hardware or software to purchase after the initial investment for the speech synthesis?

5. What form of speech technique does the speech synthesizer use?

6. How intelligible is the voice produced by the speech synthesizer?

7. How user friendly is the hardware to operate and the documentation to read?

8. What degree of computer expertise is necessary to operate the speech synthesizer?

SOURCE: L.J. Fitterman, Ed.S., Consultant for the Florida Center for Instructional Computing, University of South Florida, EDU 123-4, Tampa, Florida 33620

Micro-Computer Speech Synthesizers

This is a list of some of the speech synthesizers available:

CRICKET

STREET ELECTRONICS CORPORATION
1140 MARK AVENUE
CARPINTERIA, CA 93013
(805) 684-4593

Synthesizer for Apple IIe

ECHO II AND ECHO II+

STREET ELECTRONICS CORPORATION
1140 MARK AVENUE
CARPINTERIA, CA 93013
(805) 684-4593

Synthesizer for Apple II and IIe

ECHO - GP

STREET ELECTRONICS CORPORATION
1140 MARK AVENUE
CARPINTERIA, CA 93013
(805) 684-4593

General Purpose Synthesizer - connects to serial port - will work with a variety of computers

ECHO PC-2

STREET ELECTRONICS CORPORATION
1140 MARK AVENUE
CARPINTERIA, CA 93013
(805) 684-4593

Synthesizer for IBM-PC

SPEECH MASTER

TECMAR INCORPORATED
6225 COCHRAN ROAD
SOLON, OH 44139
(216) 349-0600

For IBM-PC and PC compatibles

IBM SPEECH ATTACHMENT

International Business Machines
1 CULVER ROAD
DAYTON, NEW JERSEY 08810
(800) 426-2468

For IMB-PC Jr.

MAGIC VOICE

COMMODORE BUSINESS MACHINES
1200 WILSON DRIVE
WEST CHESTER, PA 19380
(215) 436-4200

For Commodore 64

PERSONAL SPEECH SYSTEM

VOTRAX
1394 RANKIN
TROY, MI 48083
(313) 588-2050

For any computer with serial port

TYPE - 'N - TALK

VOTRAX
1394 RANKIN
TROY, MI 48083
(313) 588-2050 or (800) 521-1350

For any computer with serial port

SIMULATED AUTOMATED MOUTH (SAM)

TRONIX COMPANY
8295 S. LACIENEGA
ENGLEWOOD, CA 90301
(213) 215-0529

For Commodore 64

SUPERTALKER II

MOUNTAIN COMPUTER
300 EL PUEBLO ROAD
SCOTTS VALLEY, CA 95066
(408) 438-6650

For Apple II or IIe

UFONIC VOICE SYSTEM

JOSTENS LEARNING SYSTEMS
800 E. BUSINESS CENTER DR.
MT. PROSPECT, IL 60056
(800) 323-7577

For Apple IIe

ECHO TALK

To pronounce a word correctly, a speech synthesizer requires that the word be typed phonetically. If a teacher is creating a data file to use with a speech synthesis program, some experimentation will be required to get the best phonetic spelling so the speech synthesizer can "pronounce" the word correctly.

Below are samples of words that have been spelled phonetically so that the synthesizer can pronounce them correctly.

CHARACTER -: CARACTER
LABORATORY -: LABRUHTORY
NOT -; NOHTE
LEONARD -: LENARDD
MICHAEL -: MIKLE
VOLUME -: VOHLƛ-YUME
PLEASANT -: PLESANT
HEADACHE -: HEADAYK
ACCURATE -: AHCURATE
JEALOUS -: JELOUS
JOURNEY -: JURNEY
EVERYTHING -: EVRY-THING
MACHINE -: MUSHEEN
MONKEY -: MUNKEY
MUSTACHE -: MUSTASH
MULTIPLY -: MULTIPLUY
NATURE -: NAYTURE
TYPING -: TUYPING
COUGH -: CAWF
CHILE -: CHILLEY
ZENITH -: ZEENITH
RADIO -: RAYDEO
RENOVATE -: REHNOVAYTE
ROBOT -; ROBOHTE
SAN DIEGO -: SANDY-A-GO
SCHEDULE -: SKEJUUL
SPACESHIP -: SPACE-SHIP
APPLIANCE -: UHPLUYANCE
HOUSEKEEPING -: HOUSE-KEEPING
IMPLEMENT -: IM-PLEHMENT
INNOVATE -: INNOVAYTE
WEDNESDAY -: WENSDAY
ERASE -: E-RASE
MAYBE -: MAY-BE
CALENDAR -: CAHLENDAR
COUSIN -: CUHZIN

ECHO+ COMPATIBLE SOFTWARE

ADVENTURES OF JIMMY JUMPER

Handicapped Children's Computer Cooperative Project
c/o Sherwood Center
7938 Chestnut
Kansas City, MO 64132
(816) 363-4606

1 disk; 1 user's manual
$29.95
Apple IIe, IIc, 64k

A short story program for young children that focuses on prepositional concepts. Use with game paddle, or switching device.

BASIC LANGUAGE SERIES-SPATIAL CONCEPTS

C. C. Publications, Inc.
P. O. Box 23699
Tigard, OR 97223
(800) 547-4800

6 disks, 1 teacher's manual, 24 reproducible worksheets
$249.95
Apple IIe, IIc

This six-disk program teaches 24 basic spatial concepts through four types of exercises. There is limited key use. Software is appropriate for learning disabled, language impaired, mildly handicapped, moderately handicapped and mutiply impaired.

BRAILLE-EDIT

Raised Dot Computing, Inc.
408 S. Baldwin Street
Madison, WI 53703
(608) 257-9595

1 user's manual, 1 disk, 1 interface guide, 1 set of audio manuals if requested. (Manuals are available in braille at an additional cost of $300.00 or $275.00 if ordered with software.)
Apple IIe, IIc (ProDOS)

"BRAILLE-EDIT" is a multi-media word processing program for the Apple II series of computers. It enables the user to write, edit, correct, and print well-formatted letters, reports, and papers. The software simplifies the preparation of both print and braille matter. It can be used with the blind and partially sighted students.

CHATTERBOX

Voice Learning Systems

1 teacher's manual, word list, 8 disks
Software and Headset - $295.00
with Echo+ and IntroVoice - $995.00
Apple II+, IIe

The VOICE READING ABILITY DRILL first trains, and then drills sight words and reading skills. Use with learning disabilities, mildly handicapped, physically impaired and speech and language students.

COINKEYS

Castle Special Computer Services, Inc.
9801 San Gabriel N.E.
Albuquerque, New Mexico 87111
(505) 293-8379

Set of six programs designed to teach recognition of letters, numbers and coins including simple counting and addition of coins. A special version is available for blind students. The program can be used with the mentally handicapped, autistic, blind and mainstreamed exceptional students.

COLOR FIND

Handicapped Children's Computer Cooperative Project
c/o Sherwood Center
7938 Chestnut
Kansas City, MO 64132
(816) 363-4606

1 disk, 1 user's manual
$14.95
Apple IIe, IIc, 48k

Offers simple drill and practice in recognizing and matching both primary and secondary colors. Use with a keyboard with colored stickers. Can be used with physically impaired, visually impaired, mildly handicapped and moderately handicapped.

COMPUTABILITY'S POWER PAD SYSTEM

ComputAbility Corp.
101 Route 46 East
Pine Brook, NJ 07058
(201) 882-0171

1 disk, overlays
Apple IIe, IIc

Software program with five specially-divided overlays used to convert Power Pad into a touch input educational and communication device. Power pad/graphic tablet can be used with expressive language skills, articulation skills, adaptive communication device and speech development.

EDMARK READING PROGRAM LEVEL 1 SOFTWARE

Edmark Corporation
14350 N. E. 21st
P O Box 3903
Bellevue, WA 98007
(800) 426-0856

17 disks, 1 teacher's manual, 2 supplementary materials, 1 user's manual
$540.00
Apple IIe, IIc, DOS 3.3

Software can be used with any nonreader (special education or young learner) from age three to adult. It can be used with joystick or game paddle for students with multiple impairments, hearing impairments, learning disabilities, mildly and moderately handicapped, behavior disorders, communication impairments and exceptional learners in the mainstreamed classroom.

FIRST CATEGORIES

Laureate Learning Systems, Inc.
One Mill Street
Burlington, VT 07355
(802) 862-7355

1 disk, 1 teacher's/user's manual
$120.00
Apple IIe, IIc, DOS 3.3

The program uses graphics, speech and text to train six noun categories on three levels of complexity. The first level features graphics, speech and text while the second and third levels use text and speech only. It can be used with a joystick or adaptive switch device for learning disabled, communication impaired, mildly handicapped, moderately handicapped, multiply impaired, or with students who use English as a second language.

FIRST VERBS

Laureate Learning Systems
One Mill Street
Burlington, VT 05401
(802) 862-7355

1 disk, 1 user's manual
$200.00
Apple IIe, IIc, DOS 3.3

Uses eighty animated pictures to train comprehension of forty verbs. It can be used with a game paddle, switching device or touch window for physically impaired, learning disabled, mildly handicapped, moderately handicapped, severely/profoundly handicapped, autistic, communication impaired, and language impaired.

FIRST WORDS

Laureate Learning Systems, Inc.
One Mill Street
Burlington, VT 07355
(802) 862-7355

1 disk, 1 teacher's manual
$185.00
Apple IIe, IIc, DOS 3.3

This program uses colorful pictures, animation and speech to train and test comprehension of fifty early-developing nouns. There are six levels of instruction and a pre and post-test. It can be used with a joystick or adaptive switch devices for learning disabled, communication impaired, mildly handicapped, moderately handicapped, health impaired, multiply impaired, hearing impaired, or with students who use English as a second language.

GETTING STARTED IN ARITHMETIC SERIES INCLUDING SAM'S STORE

AIMS Media
6901 Woodley Avenue
Van Nuys, CA 91406-4878
(800) 367-2467

1 disk, user's manual, teacher's manual
$34.95 each, four in series for $99.00, or $140.00 for four programs and Sam's Store.
Apple IIe, IIc, DOS 3.3

This series teaches basic mathematic functions using voice output and color graphics for elementary students. It can be used with partially sighted, and exceptional learners in mainstreamed classrooms.

GOLDILOCKS AND THE THREE BEARS

Microcomputer Applications
RD #2, Box 229
Selinsgrove, PA 17870
(717) 743-7323

1 teacher's manual, 1 disk
$35.00
Apple IIe, DOS 3.3

The primary educational focus of this software is on grammatic closure (the ability to integrate discrete units into a whole). It features the use of color graphics and synthesized speech. Use with multiple impairments, mildly handicapped, learning impairments, mildly handicapped, communication impairments, speech impaired, and language impaired.

LETTER FIND

Handicapped Children's Computer Cooperative Project
c/o Sherwood Center
7938 Chestnut
Kansas City, MO 64132
(816) 363-4606

1 disk, 1 user's manual
$29.95
Apple IIe, IIc, II+, 48k

Contains five programs designed for visually impaired preschoolers. The programs teach the location of the keys on the keyboard and auditory addition. Use with a keyboard on which embossed Braille letters have been placed for visually impaired and blind.

MAGIC CYMBALS

Schneider Communication Unit
1 Customized disk, 1 user's manual
$125.00
Apple IIe, IIc, DOS 3.3, 64k

MAGIC CYMBALS is a picture based augmentative communication program with voice output. Use with single switch for multiply impaired, neuromuscular impaired, physically impaired, and speech impaired.

MASTER TALK

Sliwa Enterprise, Inc.
2360-J George Washington Highway
Yorktown, VA 23692
(804) 898-8386

1 pre-boot disk, 1 tutorial cassette
$40.00
Apple II+, IIe, IIc, IBM PC, PCjr

PCXT MASTER TALKER is a utility disk that allows virtually all of SEI's educational products as well as some unprotected standard-format disks, to be voice output. It can be used with blind and partially sighted students.

MICROCOMPUTER LANGUAGE ASSESSMENT AND DEVELOPMENT SYSTEM

Laureate Learning Systems, Inc.
One Mill Street
Burlington, VT 07355
(802) 862-7355

6 disks, 1 teacher's manual
$650.00 for 6 disks or $150.99 for the first and $120.00 for each of the other five.
Apple II+, IIe, IIc, DOS 3.3

Micro-LADS is designed to train and test auditory and/or reading comprehension of over forty grammatical constructions with students on early language development levels. Use with multiple impaired, learning disabled, communication impaired, speech impaired, mildly handicapped, moderately handicapped, visually impaired and hearing impaired.

NUTS AND BOLTS

Conover Company Ltd.
P O Box 155
Omro, WI 54963
(414) 685-5707

18 disks, 1 teacher's manual, 1 technical manual, 2 trays of manipulatives
$795.00
Apple IIe, IIc, DOS 3.3

Part of a computerized vocational education system that teaches the Exploded-View Drawing concept. It can be used with multiple impairments, hearing impaired, deaf, learning disabilities, mildly handicapped, moderately handicapped, severely handicapped and profoundly handicapped.

POINT TO PICTURES DISCRIMINATION KIT

R. J. Cooper and Associates
2144 S. 1100 E., Suite 150
Salt Lake City, Utah 84106
(801) 263-1388

3 disks, 1 teacher's manual, 1 user's manual, pictures, case, overlays, lesson plan disks (optional)
$99.95, lesson plan masters $39.95
Apple II+, IIe, 64k, ProDOS

Uses touch pad input and synthesized speech to perform simple tasks and exercises fully controlled by low functioning individuals. Use with Touch Pad or Power Pad for multiply impaired, mildly handicapped, moderately handicapped, severely/profoundly handicapped, multiply handicapped, communication impaired, speech and language impaired.

PRIMER 83

Dynacomp Inc.
1427 Monroe Avenue
Rochester, NY 14618

1 teacher's manual, 1 disk, 1 cassette
$99.95
Apple IIe

PRIMER 83 contains a number of programs designed to be used with reading impaired older students. It can be used with a joystick or game paddle or with the keyboard. Use with learning disabled, speech impaired and language impaired.

REPRESENTATIONAL PLAY/EXPLORATORY PLAY

PEAL Software
2210 Wilshire Blvd., Suite 806
Santa Monica, CA 90403
(213) 451-0997

1 user's manual, 2 teacher's manuals, 1 disk, 2 overlays, 3 frames
$119.95 each package
Apple IIe, IIc, 64k, DOS 3.3

REPRESENTATIONAL PLAY and EXPLORATORY PLAY are two packages each containing two language intervention activities, using the Muppet Learning Keys, for functional ages 18 months to five years. Use with physically impaired, neuro-muscular impaired, mildly handicapped, moderately handicapped, severely/profoundly handicapped, speech impaired and language impaired.

SAY AS I DO

Conover Company, Ltd.
P O Box 155
Omro, WI 54963
(414) 685-5707

4 disks, 1 teacher's manual
$129.95
Apple IIe, IIc, DOS 3.3

SAID is a series of microcomputer programs to help increase word skills for developmentally delayed learners and preschoolers. It can be used with joystick or game paddle for mildly handicapped, moderately handicapped, and severely/profoundly handicapped.

SIGHT WORD SPELLING

Handicapped Children's Computer Cooperative Project
7938 Chestnut
Kansas City, MO 64132
(816) 363-4606

1 disk, 1 user's manual
$29.95
Apple IIe, IIc, 64k, DOS 3.3

Program uses synthesized speech to present practice lessons in spelling on a primary level. Use with visually impaired, partially sighted, learning disabled, mildly handicapped, moderatey handicapped, behavior disordered, emotionally handicapped, autistic, communication impaired, speech impaired and language impaired.

SOFTWARE FOR VISUALLY IMPAIRED CHILDREN

Sensory Aids Foundation
399 Sherman Avenue, Suite 12
Palo Alto, CA 94306
(415) 329-0430

1 user's manual, 1 disk
$50.00
Apple II

This program contains spelling drills, a typing tutor, and a voice output authoring system. Use with the blind or partially sighted.

SPEAK UP

Laureate Learning Systems, Inc.
One Mill St.
Burlington, VT 97355
(802) 862-7355

1 disk, 1 teacher manual, (disk with dictionary of 1500 additional words available).
$95.00
APPLE II+, IIe, IIc; DOS 3.3

This utility program works with the Echo Speeech Synthesizer to produce and store high quality speech. Words and phrases can be created for easy access. Can be used with speech impaired for expressive language skills.

SPELLIST

Castle Special Computer Services Inc.
9801 San Gabriel N. E.
Albuquerque, New Mexico 87111
(505) 293-8379

1 teacher's manual, 1 disk
$45.00
Apple IIe, 12Pro DOS or DOS 3.3, IBM PC, PCjr, 128k, PCDOS

Program has spelling words that can be presented in different styles to adapt to the needs of each individual student. It can be used with the blind, partially sighted, mildly handicapped, moderately handicapped, severely/profoundly handicapped, autistic and exceptional learner in the mainstreamed classroom.

SURVIVAL WORDS

Conover Company Ltd.
P O Box 155
Omro, WI 54963
(414) 685-5707

3 disks, 1 teacher's manual
$129.95
Apple IIe, IIc, DOS 3.3

Software introduces and drills critical sight vocabulary words. Use with joystick or game paddle or keyboard for hearing impairments, deaf, mentally handicapped, moderately handicapped or severely handicapped.

TALK II

ComputAbility
101 Route 46 East
Pine Brook, NJ 07058
(800) 631-7277

1 disk, 1 user's manual
$135.00
Apple IIe, 64k

TALK II enables the computer to be used as an augmentative communication device. It can be used for evaluation and training of individuals waiting for portable devices. Use with keyboard or single switch for physically impaired, communication impaired and speech impaired.

TALKING SCREEN TEXTWRITER

Computer Adventures, Ltd.
P O Box 15565
Phoenix, AZ 85060
(602) 954-0293

1 teacher's manual, 1 user's manual, 3 disks
$159.00
Apple IIe

A talking word processor that can pronounce each letter and/or word as the child types it on the screen and will conveniently move or correct the text when necessary. It can be used with multiple impairments, visually impaired, learning disabled, gifted and talented, mildly handicapped, moderately handicapped, severely handicapped, autistic, language impaired, and exceptional learners in mainstreamed classrooms.

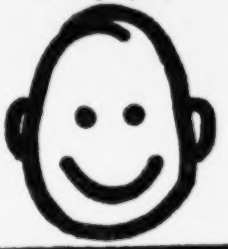
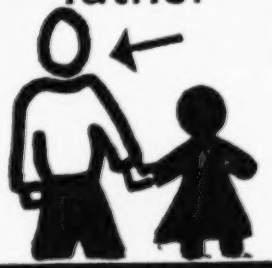
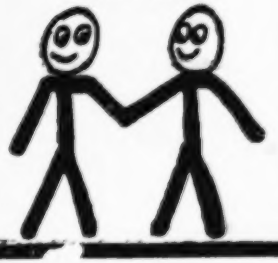
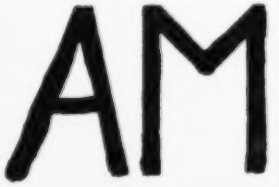
TALKING WRITER

Cross Educational Software
P O Box 1536
Ruston, LA 71270
(318) 255-8921

1 disk, 1 user's manual
$24.95
Apple IIe, DOS 3.3

TALKING WRITER provides five programs including a voice output text editor, a typing tutor and games. Keyboard can be used with blind, partially sighted, and adaptive communication devices.

Handout #D-1a

	happy 	on	Halloween	father 
	ready	on	month	friend 
	sweater	how much	watch	sick
	body	wallet	morning 	I, me

This is a sample communication board. It is not meant to be arranged in the format normally used with children. It simply demonstrates that picture symbols or words used as an overlay with a touch sensitive tablet can print on the monitor or speak through a speech synthesizer. For example: The picture entitled "wallet" can display the words 'wallet' when touched or it can display a phrase such as "How much money do I have?" or "How much does that cost?" or "I need money." The possibilities are endless. Look at the various pictures..

Discuss briefly different phrases that could be programmed into the computer for some of the pictures.

Discuss how the use of complete sentences printed or spoken by the computer might begin to expand the communication abilities of a non-vocal student.

Muppet Keyboard

Below are nine suggestions on how the Muppet Keyboard can be incorporated into the teaching curriculum. The activities first appeared in an article written by Miriam Furst and published in the April/May 1986 edition of Closing the Gap.

In addition to using the Discovery Disk to develop vocabulary, letter recognition, sound-symbol correspondence and basic number concepts, try some of these activities.

1. Start with a clear screen. Place some objects on the screen -- e.g., four blue ostriches. Let the child look at them for a short time. Hit the "oops" key to erase the picture. Ask the child to tell you what was in the picture. Hit the "oops" key again. The picture will appear and the child can check his answer.

2. Write simple sentences or phrases on 3"x 5" cards -- e.g. "5 blue rockets" or "Can you make two yellow kites?" Draw the correct pictures on the back of the cards. (You could use multiple copies of the small, reproducible picture chart in the manual to make the pictures.) Give the child a card. Ask him to use the keyboard to create the picture described on the card. Let him check his answer by turning the card over and matching pictures.

3. Tell a simple story using the objects, numbers and colors on the keyboard. As you read the story have children use the keyboard to illustrate each scene -- e.g., "Four red monkeys were taking a walk. They looked up into the sky and saw nine blue kites waving in the wind. Suddenly the air was filled with music. A little yellow bird heard the music and came to see what was happening. 'I can sing too,' said the bird. 'Want to hear me?'" etc.

4. Have small groups of children write or dictate stories that can be illustrated with the Muppet Keys.

5. After children are familiar with the sounds and songs produced by different characters, have them close their eyes and identify the characters producing a particular sound.

6. Teach children the words to the songs -- e.g., "Old MacDonald," "Camptown Races," and "Oh, You Beautiful Doll." Let them sing along with the computer music.

7. Have children imitate the actions of some of the characters as they move on the screen -- e.g., try moving like a bird, a jack-in-the-box, an umbrella opening and closing, a kite gliding through the sky, etc.

Muppet Keyboard (Continued)

8. Have children play "speed limit." Give the children oral or written directions and then activate the sound. For example, place a white dragon on the screen and ask, "Can you change the dragon to purple before it breathes fire three times?" Clear the screen and ask, "Can you put three red alligators on the screen and then change them back to blue, before the song is over?"

9. Before beginning an activity, record the child's present skill level. Use the control options to tailor games to the children's needs. As they master certain letters or numbers, add others. Keep a written record of their progress. Occasionally go back and review previously learned concepts.

Muppet Learning Keys:
Publisher:
Sunburst Communication, Inc.
39 Washington Ave.
Pleasantville, NY 10570
Toll-Free 1-800-431-1943

SOFTWARE FOR THE MUPPET KEYBOARD*

Available from:
Sunburst Communications
RM #FQ05
39 Washington Avenue
Pleasantville, NY 10570-9971
800-431-1934

Muppet Learning Keys for Apple IIe $99.00
Specially Designed keyboard with numbers and letters in sequential order, plus eight color keys. One disk contains three programs to teach letter, number, picture and color recognition.

Getting Ready to Read and Add $65.00

Teaches shape discrimination and letter and number recognition.

Iggy's Gnees $65.00

Early problem solving software using attributes.

Muppet Learning Keys Tool Kit $40.00

Requires knowledge of BASIC programming so that user can add routines to existing programs.

Muppet Slate $65.00

Software for early writing experiences.

Muppet Word Book $65.00

Teaches uppercase and lowercase letters, word endings and beginnings, consonants and vowels. Has a print option.

Muppetville $65.00

User takes a "trip" through Muppetville and performs activities related to color, shape, number and pattern recognition.

Simon Says $65.00

Teaches memory skills by asking students to remember sequences of colors, letters and numbers.

Teddy's Playground $65.00

Develops critical-thinking skills through manipulation of attributes (colors, shapes and shading).

Tiger's Tales $65.00

Series of interactive stories use a problem-solving approach to beginning reading and comprehension.

SOFTWARE FOR THE MUPPET KEYBOARD* CONT.

Available from:
Pearl Software
3200 Wilshire Boulevard, Suite 1207
Los Angeles, CA 90010
213-739-9062

Exploratory Play $120.00

Programs for early acquisition of language. Picture overlays are used on the Muppet Learning Keys. The child presses a picture and the word is spoken through the Echo Speech Synthesizer.

Representative Play $120.00

Software has two activities: "Doll Play" and "Car Play." Makes use of both the Muppet Learning Keys and the Echo Speech Synthesizer.

*This bibliography represents availability of software for a particular adaptive device. The list is not necessarily intended to be exhaustive. Nor is this list a recommendation for purchase. Prices may vary. Educational personnel should consult resources of evaluated and recommended software prior to making a purchase.

TECHNICAL POINTS FOR THE

POWERPAD

- Outside dimensions: 20" x 17" x 1.5"
  Active surface area: 12" x 12"
  Weight: 4.5 pounds
  Power: 5-12 volts from host
  Less than 2 ma.

- Resolution: 1/10" x 1/10" in both directions
  100 points per square inch
  14,400 switches beneath mylar surface.

- Characteristics:

  * Capable of recognizing multiple simultaneous touches as well as discrete points. Employs digital technique.
  * Electronics of the PowerPad scan the entire work surface about 20 times a second.
  * PowerPad "talks" to the computer through the game port on most home computers; involves a software interface.
  * PowerPad has a serial interface, but is not an RS-232.
  * Connects to a computer through a serial interface (4 wire interface - 2 in, 2 out); usually the game port with a PowerPad connector cable.
  * Connects to:

Commodore 64	- through port 1
VIC 20	- 1st control port
Atari	- 1st controller jack
Apple II, II+, IIe	- requires special starter cable to connect to the I/O game receptacle inside computer.
IBM	- requires special starter cable.

  * Can run programs written by users in BASIC; most ChalkBoard software is written in assembler, BASIC or LOGO.
  * PowerPad could be interfaced with other computers but requires someone with interfacing experience.
  * Specific technical data can be obtained from the ChalkBoard PowerPad Programming Kit.

SOFTWARE FOR THE APPLE AND THE POWER PAD*

The following software titles can be used with the Power Pad and the Apple IIe computer. All of the listed titles can be purchased from

Dunamis, Inc.
3620 Highway 317
Suwanee, GA 30174
(404) 932-0485

or

Software Support Co.
1325 N.E. 12th Terrace
Gainesville, FL 32601
(904) 374-8847

BEARJAM $39.95

Made up of six education games that help prepare children for reading.

CONTROL WITHOUT KEYS $299.00

Designed for the nonverbal student. Words and phrases can be customized through a simple keyboard overlay for the Power Pad. It can be used with the Echo Speech Synthesizer.

DRESS-UP SERIES $39.95 each or 118.89 for three titles

Hot and Cold Foods
Treasure Hunt
Shart-Not Sharp
Getting Around
Ricochet's Costume

Programs invite the discussion of concepts such as hot and cold, food groups, opposites, occupations and transportation.

EARLY LEARNING I $79.95

Presents four learning activities for the student: matching colors, counting numbers, learning shapes and matching letters. The Echo Speech Synthesizer is recommended.

EARLY LEARNING II $69.95

Four training activities teach simple mathematics. Two options teach simple addition of numbers shown on the screen with the help of objects presented for positive reinforcement. Two options help students learn number sequencing by finding the missing number in a series. The Echo Speech Synthesizer is recommended.

EXTRATELETACTOGRAPH $79.95

ET is a creative graphics program that gives an individual the power to create colorful drawings using the PowerPad as well as to add in captions or descriptions of the drawings.

SOFTWARE FOR THE APPLE AND THE POWER PAD* (CON'T)

GARDEN SERIES $39.95 each or $299.95 for all titles

I Grow My Garden
Trees and Seasons
Gardening Tools
Parts of a Flower
Water in its Different States
Growing a Bean Seed
Vegetables and Their Leaves
Flowers and Leaves

Collections of eight software programs that can be purchased separately or in a package. Each program helps the student become better acquainted with nature and the seasonal changes that take place.

LOGIMASTER $39.95

A game of logic.

MICROILLUSTRATOR $49.95

Allows user to create, revise, adapt and combine pictures, designs, diagrams, and colors.

MIX N' MATCH $69.95

Four training activities teach the concepts of sorting, counting and matching.

POINT TO PICTURES $49.95 each

Speech-oriented program designed to teach object recognition. There are four diskettes in the series:

Colors
Shapes
Numbers
Letters

It uses the speech synthesizer to pronounce the object the student has pointed to and give praise for the correct answer.

POINT TO PICTURES DISCRIMINATION KIT $199.95

Comes with two switch-modified battery toys a Point-to-Pictures interface box and a lesson disk. With this kit, the student activates a battery-powered toy when the PowerPad is touched. It can be used with the Echo Speech Synthesizer.

SOFTWARE FOR THE APPLE AND THE POWER ADD* (CON'T)

POINT TO PICTURES MASTER DEVELOPMENT KIT $99.95

Allows teacher to custom design lessons using graphics produced with MicroIllustrator. It can be used with the Echo Speech Synthesizer.

SIMPLECOM I and II $49.95 each

Designed for nonverbal, severely disabled individuals. It can be used with the Echo Speech Synthesizer to provide a customized communication system for the user.

SYMBOL WRITER $109.95

A software program that allows nonreaders to form simple two to three word sentences using the PowerPad or a single switch. The main objective is to provide a cause/effect activity with a language component. The Echo Speech Synthesizer is recommended.

TOUCHCOM $128.00

An expressive communication system that can be used for vocal communication or can be used as an instructional aid. The PowerPad can be setup pictures, symbols, words or letters from one to six inches in size. The Echo Speech Synthesizer is recommended.

* This bibliography represents availability of software for a particular adaptive device. This list is not intended to be exhaustive, nor is this list a recommendation for purchase. Prices may vary. Educational personnel should consult resources of evaluated and recommended software prior to making a purchase.

SOFTWARE FOR THE APPLE AND THE POWER PAD (CON'T)

The following software titles, for use with the PowerPad and Apple, are available from the UCLA Intervention Program. At the time this Training Module went to press, the programs were still being field-tested. The cost of each program title is $15.00. UCLA accepts checks only, no purchase orders. All programs use a color monitor and Echo Speech Synthesizer.

Wheels on the Bus - nursery school song that is activated to sing a given verse by pressing 1 to 5 pictures on overlay.

This is the Way We Wash Our Face - another familiar song containing 5 verses represented in picture form on an overlay.

Family Fun - program with family members and household items represented graphically on overlay. Program can be utilized as matching activity or representational play. (18 months - 5 years)

Buddy's Body - is a body parts program containing 2 levels with animation: a) facial features; b) larger body parts. each level has its own overlay.

Padded Food - program overlay depicts familiar foods and can be used as a matching or categorizing program.

Paper Dolls - Dress Me First - (level I) - 5 articles of clothing are depicted on the overlay to dress the paper doll (boy or girl).

Paper Dolls - Dress Me Too - (level II) - 12 articles of clothing are depicted on the overlay to dress the paper doll (boy or girl). School day, a rainy day, or a "silly" day are options to choose from. (3 - 5 years)

"Zoo Time" - 5 familiar zoo animals to select from.
Level 1 - child selects any animal; level 2 - child selects animal by name; and level 3 - child selects animal by action. Game accomodates 1-4 players, player's names are entered by teacher.

Note the Power Pad overlays are black and white. For best results, color overlay using the booted up program, as a model, then cover with clear contact or laminate.

SOFTWARE FOR THE IBM AND THE POWER PAD

The following software titles can be used with the PowerPad and the IBM computer. All of the titles can be purchased from:

DIL
2025 Rue Lavoisier
Suite 180, Sainte-Foy
Quebec, Canada G1N 4L6
(418) 687-9788

or

Dunamis, Inc.
3620 Highway 317
Suwanee, GA 30174
(404) 932-0485

THE ZOO $89.95

A series of ten programs aimed specifically at the preschool and kindergarten student, introduces concepts related to animals in the zoo and help the young child practice basic skills such as shape and number recognition, sequencing and spatial orientation.

THE WALKABOUT $79.95

An applications program based on the K-6 social studies program. The student can select a number of elements from four different data banks and organize them to draw real-life or imaginary streets, neighborhoods and cities. Students learn about natural and man-made elements in their surroundings as well as the concept of space.

PROLONG THE LIFE OF YOUR POWER PAD CABLE

Plug or unplug cables and Power Pads **ONLY** with the entire power OFF.

Unplug the Power Pad at the telephone jack end when using other non-Power Pad software.

Because static electricity builds up in the Power Pad cable, whenever reconnecting a Power Pad using the telephone jack end, ground the cable by touching the plastic clip to something metal, such as a table. This will remove the electrical charge and consequently save the cable and potentially the Power Pad.

If you need to plug and unplug the Power Pad at the 16 pin connector, purchase an E-Z Scotter port which extends the 16 pin connector to the outside of the Apple II case.

DUNAMIS, INC.
3620 Highway 317
Suwanee, GA 30174
404-932-0485

On October 16, 1987, Dunamis, Inc. President, Ben Satterfield, announced that Dunamis had completed development of a new interface cable to connect the PowerPad touch tablet to the Apple IIe computer. This new cable permits the normal operation of the PowerPad with the most recent versions of the Apple IIe (motherboard revisions C, D, E, as well as the older A, and B versions).

The retail price of the 7004P cable is set at $19.95.

The newest version of the Apple IIe motherboard had two changes that presented problems for the PowerPad. The first involved the fact that the line which the PowerPad used to communicate to the Apple computer was hard-wired to the shift key to facilitate the use of a mouse in word processing programs. The second problem related to the addition of a set of capacitors which have been added to the C, D, and E revisions of the Apple IIe motherboard. These capacitors were required by the FCC regulations limiting noise and interference. They had the effect of "freezing" PowerPad programs and preventing effective communication between the PowerPad and the computer. The new cable has the effect of neutralizing both problems.

Directions for Making Tactile Graphics Using the PowerPad

This program is a unique combination of readily available hardware and software to produce raised dot graphics for blind students. An Apple IIe computer, a Cranmer Modified Perkins Brailler and Powerpad, along with the PowerPad Starter Kit and the Super Cranmer Graphics Package, will be needed for the task which is described below:

1. Plug PowerPad cord into joystick receptacle inside Apple IIe.

2. Attach other end of PowerPad cord to the PowerPad.

3. Boot the MicroIllustrator software.

4. The screen will say "Press PowerPad to Continue." Touch the PowerPad's drawing surface.

5. The menu will then appear on the screen. Press the "MENU" spot on the PowerPad to move to the drawing screen.

6. With one hand draw your picture; with the other hand touch the "PEN DOWN" spot on the PowerPad. What you draw is only recorded on the screen if you are holding "PEN DOWN." You may move and position the cursor without leaving marks if you move the cursor when you are not holding "PEN DOWN."

7. When you finish drawing, touch the "MENU" spot on the PowerPad. The menu will reappear on the screen.

8. Using your finger on the PowerPad, move the cursor to the "STORAGE" box on the menu. When you have the cursor in the "STORAGE" box, touch the "PEN DOWN" spot on the PowerPad.

9. The disk will whir and a new menu will appear on the screen. Using the Apple keyboard with the CAPS LOCK key depressed, select "S" for save. Select "2" to store your picture on a data disk in Drive 2. Type in a name for your picture.

10. Leave the data disk in Drive 2. Remove the MicroIllustrator disk from drive 1 and put the Super Cranmer Graphics Package (SCGP) disk in drive one. Hold the control key, the open apple key, and the reset key to boot the SCGP.

11. The SCGP will say "Press any key to continue." Press any key.

12. The SCGP will then present a menu. Select "L" for Load.

13. Select "2" for Drive 2.

14. Type in the name of your picture. Start with "PICTR" (no quotes). All PowerPad picture names begin with PICTR.

15. Again, hit any key to continue.

16. Select "D" for Dump to Cranmer.

17. Next, you are asked which slot your Perky (Cranmer Modified Perkins Brailler) is plugged into. Press the appropriate number Key (1 through 6) and RETURN.

18. Put 11" x 11-1/2" paper into Perky. Give Perky an H chord, H; S chord, Y; G chord, Y; R chord. (A chord on Perky is pushing the keys for the letter and the space bar at the same time.)

19. Push RETURN on the computer and Perky should start printing.

20. If your picture fits on one page, give Perky a 4-5-6 chord to release the paper and turn Perky off. If your picture takes more than one page, remove the page, put in another page and give Perky a 4-5 chord to continue printing. Repeat this sequence until the entire picture is printed. Turn Perky off after the last page is printed.

21. To draw a picture that fits on one piece of 11" x 11-1/2" paper, you need to draw in the upper-left corner of your PowerPad. You can mark a rectangle approximately 3-3/4" by 5-1/2" on the upper-left drawing surface of the PowerPad.

22. The plastic overlay on the PowerPad can be lifted up and a drawing can be placed under it. Replace the overlay and you can then trace the picture.

Hardware Required:

1. Apple IIe computer

2. Cranmer Modified Perkins Brailler
   (available from:
   Maryland Computer Services
   2010 Rock Spring Road
   Forest Hill, MD 21050
   (301) 879-3366)

3. PowerPad
   (available at local computer stores or direct from:
   DUNAMIS
   2856 Buford Highway
   Duluth, Georgia 30316
   (404) 476-4934)

Software Required:

1. PowerPad Starter Kit (includes MicroIllustrator software and PowerPad cable)

2. Super Cranmer Graphics Package
   (available from:
   Raised Dot Computing
   408 S. Baldwin Street
   Madison, WI 53703)

These directions were prepared by:

Catherine Mack
Computer Resource Center
207 N. San Marco Ave.
St. Augustine, FL 32084
(904) 82 -1654 ext. 581
SUNCOM 683-1581

Touch Sensitive Tablet

Touch Window

The Touch Window, available from Sunburst, attaches easily to a computer monitor with velcro-type strips to convert the computer into a touch screen. It plugs into the joystick port on the back of the Apple. It can also be used as an 8-1/2" x 11" graphic tablet to create colorful graphics by drawing, tracing or painting with a special pen.

A third use of the Touch Window requires an Interactive Book provided with a program.

The Touch Window Tool Kit allows the user to design his or her own software.

SOFTWARE FOR THE TOUCH WINDOW*

Available from:
Sunburst Communications
RM #FQ05
39 Washington Avenue
Pleasantville, NY 10570-9971
800-431-1934

TOUCH WINDOW $199.95

Includes touch screen, disk, interactive book, velcro strips and manual.

THE FACTORY $65.00

Using color graphics and animation, this three-level program challenges students to create geometric "products" on a simulated machine assembly line that they design.

MEMORY BUILDING BLOCKS $65.00

Students build visual and auditory memory skills as they play Concentration-type games.

MUPPET WORD BOOK $59.00

Teaches beginning language concepts through games on uppercase and lowercase letters, word endings and beginnings, consonants and vowels.

SOFTWARE FOR THE TOUCH WINDOW

Sunburst Communications Software (Cont.)

MUPPETVILLE $65.00

User takes a 'trip' through Muppetville and performs activities related to color, shape, number and pattern recognition.

NOW YOU SEE IT, NOW YOU DON"T $69.00

Two programs challenge memory recognition as students try to find the missing parts of a puzzle.

ODD ONE OUT $65.00

Develops classification skills as students try to identify the odd one out of four items presented on the screen. Can be customized.

SIMON SAYS $65.00

Memory strategies are developed as students try to remember sequences of colors, numbers and letters.

THE RIGHT TURN $65.00

Allows students to predict, experiment and learn about mathematical concepts of rotation and transformation.

TEDDY AND IGGY $65.00

Provides activities in sequencing and memory.

TIGER'S TALES $65.00

Series of interactive stories about the adventures of Tiger, a cat. Reinforces comprehension and vocabulary skills.

TOUCH WINDOW TOOL KIT $49.95

Allows user to design his or her own software to work with the Touch Window.

TOUCH N'WRITE $75.00

Twenty-one lesson curriculum based on the Palmer Method of manuscript handwriting.

WHAT'S IN A FRAME? $65.00

A number of objects appear in a frame for a limited length of time. Students are shown one object at a time and asked to recall if it was in the frame or not.

SOFTWARE FOR THE TOUCH WINDOW (Cont.)

Available from:
Creative Learning
P.O. Box 516
North San Juan, CA 95960
916-877-1366

BREAKTHROUGH TO LANGUAGE SERIES $250.00 each volume

An extensive language curriculum utilizing paced instruction. Voice and touch technology make it appropriate for young children, non-readers, and the severely handicapped. Vol. I-Words; Vol. II-Sentences; Vol. III-Writing and Vol. IV-Lesson Builder (author system).

Available from:
Edmark Corporation
P.O. Box 3903
Bellevue, WA 98009
800-426-0856

EDMARK READING PROGRAM (Level I) $450.00

A beginning reading and language development program that teaches 150 words plus endings. The computer verbally cues students through the lesson. Uses Echo Speech Synthesizer.

Available from:
Handicapped Children's Computer Cooperative Project
c/o Sherwood Center
7938 Chestnut
Kansas City, MO 64132
816-363-4606

TOUCH AND MATCH $39.95

Helps children find differences and similarities among categories of objects and to match these objects based on their characteristics.

TOUCH AND SEE $39.95

Helps children learn to match similar objects.

SOFTWARE FOR THE TOUCH WINDOW (Cont.)

Available from:
Hartley Courseware, Inc.
Box 419
Dimondale, MI 48821
800-247-1380

MY WORDS $69.95

Students learn to read and write by hearing their own stories read to them. Uses the Echo Speech Synthesizer.

Available from:
Laureate Learning Systems
110 East Spring Street
Winoski, VT 05404
802-655-4755

FIRST VERBS $185.00

Introduces students to forty (40) verbs, each one represented by two pictures. Six levels of training are offered. Uses the Echo Speech Synthesizer.

FIRST WORDS $185.00

Uses colorful pictures to teach and test fifty (50) early developing nouns. Uses the Echo Speech Synthesizer.

FOLLOWING DIRECTIONS $225.00

Two disks help students learn one and two level commands while teaching important basic concepts in eight activities.

FOLLOWING DIRECTIONS LEFT AND RIGHT $150.00

Teaches left/right discrimination concepts in ten activities. Uses Echo Speech Synthesizer.

TALKING PICTURE SERIES $100.00 each or $250.00 for series

There are three programs in the series: Talking Verbs, Talking Nouns I, and Talking Nouns II. Each is designed to encourage language development. Each program comes with a disk, manual and template.

MICRO-LADS $750.00

Series of programs that teach fundamental syntactic rules. Seven programs can be purchased individually or in packages.

SOFTWARE FOR THE TOUCH WINDOW (Cont.)

Available from:
Marblesoft
21805 Zumbrota N.E.
Cedar, MN 55011
612-434-3704

EARLY LEARNING I $45.00

Teaches recognition of eight basic colors; identify shapes by sight and sound; recognize numbers and count from 1 to 9; and learn the alphabet in upper and lower case. Use with Echo Speech Synthesizer.

EARLY LEARNING II $40.00

Teaches simple addition of numbers and number sequencing by finding the missing number. Use with Echo Speech Synthesizer.

MIX 'N MATCH $40.00

Teaches classification of objects by shape and color; relationships between objects having the same or different shape, color or size; and patterns in a sequence of objects. Use with Echo Speech Synthesizer.

Available from:
Mindscape, Inc.
Educational Division
Dept. N
3444 Dundee Road
Northbrook, IL 60062
312-480-7667

BANK STREET STORYBOOK $39.95

Allows user to create multi-page stories using pre-programmed animated graphics. Use with Koala Pad or mouse.

Available from:
Personal Touch Corporation
4320-290 Stevens Creek Boulevard
San Jose, CA 95129
408-246-8822

TIMEKEEPER $39.95

Four activities provide drill for students in learning how to tell both digital and analog time.

SOFTWARE FOR THE TOUCH WINDOW (Cont.)

Available from:
Scholastic, Inc.
904 Sylvan Avenue
Englewood Cliffs, NJ 07632

STORY MAKER $95.00

Students create a graphics scene by selecting from a catalog of pictures or creating their own, then write stories selecting from eight typefaces.

For the following three programs, select the 'Koala Pad' option and use the Touch Window as a graphics tablet on a table top or on the lap.

BLAZING PADDLES (Baudville) $49.95

COLOR ME (Mindscape) $29.95

DAZZLE DRAW (Broderbund) $59.95

Available from:

Upgrade Systems
231 Shorewood
Hilton Head Island, SC 29928
(803) 842-5469

I Am Proud* (Sight words) $

Ice Cream, Please* (Nouns) $49.95

Let's Go!* (People, places and things) $49.95

Seeing, Touching, Being* (Verbs) $49.95

Survival Words* $49.95

Know Your ABCs* $49.95

Magic Speller* $49.95

*REQUIRE CONTROL PROGRAM $125.00

Unicorn Expanded Keyboard Operation Procedures*

I. Standard Mode

A. Materials Needed:

1. Apple IIe with disk drive and monitor
2. Adaptive Firmware Card (installed)
3. Unicorn Keyboard with cable
4. Standard overlay that emulates the Apple keyboard

B. Operation: Computer OFF

1. Slip the standard overlay under the cover sheet on the keyboard. make sure that the overlay is entirely under the cover sheet without any edges sticking out.

2. Connect cables from the Firmware interface I/O box to the Unicorn keyboard.

3. Turn on the Firmware card (switch on I/O box towards the red light)

4. Place student's software program in disk drive.

5. Turn computer on.

6. A "Startup Menu" will appear on the screen.

7. Press RETURN to indicate you are selecting STANDARD/TEMPORARY.

8. The Method/Rate description will appear on the screen.

9. Press "A" (input-method), then press RETURN.

10. Press "0" (zero) (Expanded Keyboard), the press RETURN.

* Please refer to the Owner's Manual for complete operating instructions.

11. You have just set the Firmware card to accept the Unicorn keyboard as the input method.

12. Next, you will set the input rate.

13. Press "B" (input-rate), then press RETURN.

14. Input rate ranges from 0 - 10, 10 being the most sensitive response. The default rate is "5." NOTE: You must evaluate and experiment with different input rates for each student who will be using the Unicorn.

15. Press "0 - 10", then press RETURN.

16. Press RETURN again. Your software program will then be loaded into the computer.

17. The Unicorn is now ready for student use.

C. Operation: Computer On - Change Input Rate

1. Press "CONTROL", "A", and "1" simultaneously. This will take you back to the Method/Rate description.

2. Press "B", then press RETURN.

3. Select "0 - 10" (designed rate), then press RETURN.

4. Press RETURN again.

5. You will go back to the original program with the new input rate.

D. Operation: Computer On - Change From Regular Computer Use To Expanded Keyboard Use

1. Follow directions B1 and B2.

2. Insert new software program and Warm Boot (press CONTROL , Open Apple Key , and RESET simultaneously).

3. Turn ON the Firmware card.

4. Press CONTROL , "A", and "1" simultaneously.

5. Follow directions B8 to B17.

II. Customized Mode

A. Materials Needed

1. Apple IIe with disk drive and monitor
2. Adaptive Firmware card (installed)
3. Unicorn Keyboard with cable
4. Adaptive Firmware card SETUP disk
5. Student program disk

B. Determine Input - the first step in the process is to determine the input required by the program you plan to use for the student.

1. Boot the student's program disk.

2. Make a list of every input required to operate the program. Remember to include BACKSPACE so mistakes can be erased.

3. When finished remove disk.

C. Customize Keyboard

1. Computer should be OFF.

2. Install keyboard cable in I/O box and in the Unicorn keyboard.

3. Insert Adaptive Firmware Card (AFC) SETUP disk into drive and turn on computer.

4. Turn on AFC.

5. The following menu will appear on the screen

   PLEASE SELECT ONE
   0 INITIALIZE A.F.C.
   1 CREATE CUSTOM FILES
   2 LOAD & USE CUSTOM FILES
   3 WORD PROCESSOR SETUP
   4 STARTUP MENU UTILITIES

   ? (TYPE NUMBER AND HIT "RETURN")

6. Press"1"(Create Custom Files) and press RETURN.

7. A CREATE PROGRAMS menu will appear on the screen.

8. Select"4"(Custom-Keyboard) and press RETURN.

9. Read information on screen. Press any key to continue.

10. Read information on screen. Press any key to continue.

11. You will see the following message on the screen:

    DO YOU WANT TO CREATE A NEW MESSAGE SET,
    EDIT AN OLD ONE, DELETE AN OLD ONE, OR
    QUIT? (N,E,D,Q)?

12. Press"N"and RETURN.

13. Read the different configurations available to you. Decide which configuration is most suitable for the student(s) you wish to use the program. Select the configuration you want to use and press RETURN.

14. At this point you can select the Input Rate. This rate determines how long a key must be pressed before the computer accepts the in-put. For this exercise, simply press RETURN to keep present value of 10.

15. Read instructions on the screen and, when finished, press RETURN.

16. Press the key on the Unicorn you want to program.

17. Enter the message you want the key to represent. Press RETURN.

18. If you want to insert a special message, press ESC. You will then be given a list of the special messages you can use.

1. ESC	7. OPEN-APPLE
2. RETURN	8. SOLID (CLOSED)-APPLE
3. BACKSPACE	9. CTRL
4. SPACE	10. SHIFT
5. RIGHT ARROW	11. RESET
6. REPEAT	12. CAP-LOCK

Select the message you want to insert by pressing the number to the right of the message then press RETURN. This special message symbol will appear at the top of the screen to the left of the flashing cursor. Press RETURN again.

19. Continue to program the Unicorn until you have all inputs necessary to run the educational program you have chosen.

20. Press CONTROL Q when finished.

21. Answer 'Y' to save the messages to the disk.

22. Enter file name as the name of the program you want to use.

23. Enter 'Q' (Quit).

D. Operation Of Software

1. The following menu will appear on the screen:

PLEASE SELECT ONE:

0 INITIALIZE A.F.C.
1 CREATE CUSTOM FILES
2 LOAD & USE CUSTOM FILES
3 WORD PROCESSOR SETUP
4 STARTUP MENU UTILITIES

? (TYPE NUMBER AND HIT RETURN)

2. Select "2" and press RETURN.

3. A LOAD PROGRAMS menu will appear. Select 5 (Keyboard-Load) and press RETURN.

4. A KEYBOARD-LOAD PROGRAM menu will appear on the screen. Select the program you have just created by pressing the number and RETURN.

5. Make your selections as to Input Method (0 = Expanded Keyboard) and Input Rate. Press RETURN only if you want to keep the present values

6. Select "2" (REDEFINED MODE) and press RETURN.

7. Follow instructions on the screen. Remove the AFC SETUP disk. Insert the program you want to use. Press CONTROL and RESET simultaneously to boot the new disk.

8. Use the Unicorn Keyboard to operate the program.

III. Important Considerations

A. Equipment Setup

1. It is important that the keyboard is positioned properly so that the student may have the best and most convenient access available. A physical therapist should be consulted on this decision.

B. Input Rate

1. The ability of being able to control the input rate of the Unicorn is one of the most important features of this adaptive device.

2. The input rate will have to be adjusted for each student.

3. You should try and increase the input rate as the student becomes more familiar with the key placements. This aids in developing fine motor control and speeds up data entry.

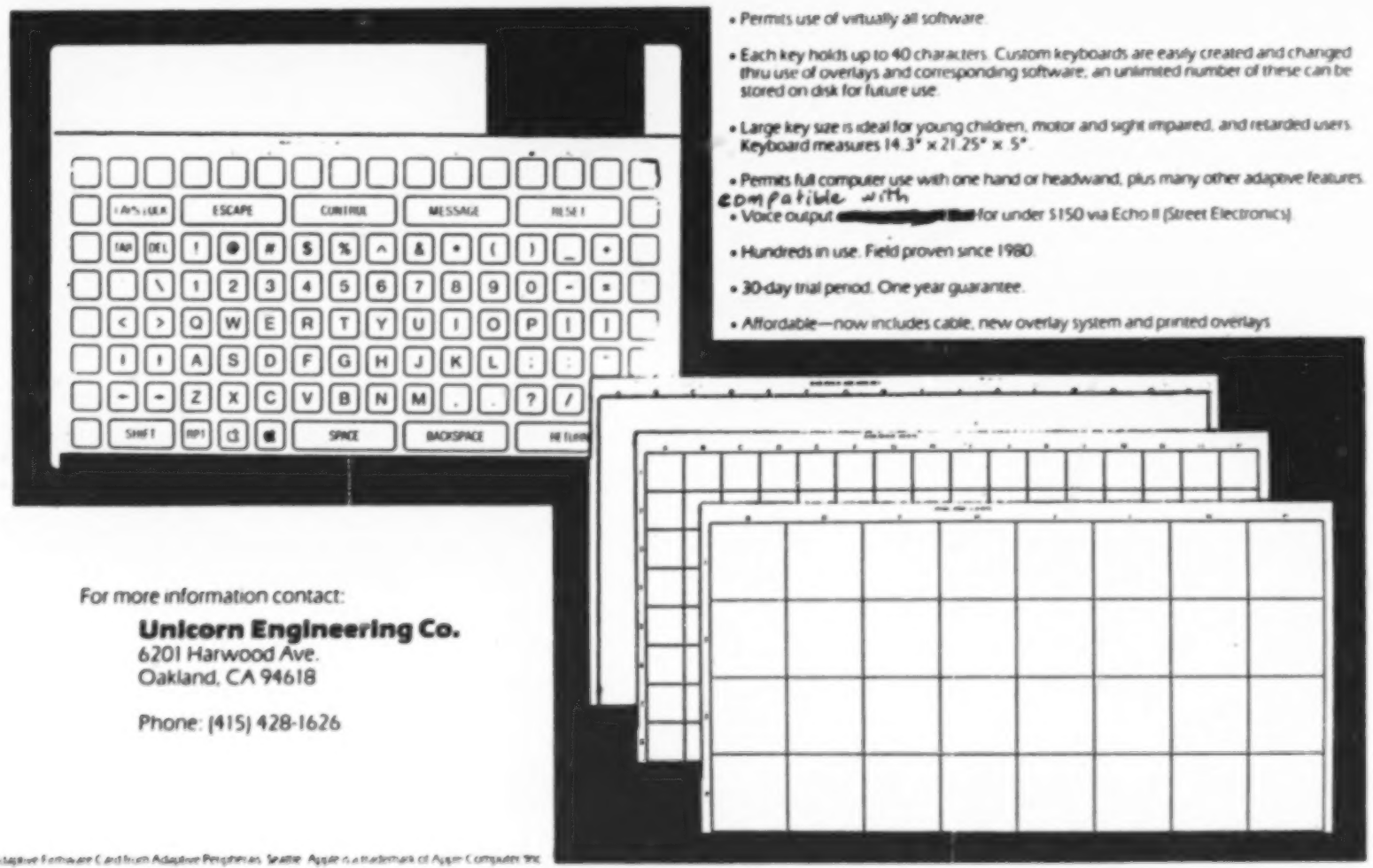
IV. Credits

* Unicorn Engineering Company
  6201 Harwood Avenue
  Oakland, CA 94618
  (415) 428-1626

* Dr. Vicki Casella
  San Francisco State University
  San Francisco, CA

Unicorn Expanded Keyboard Model 1

Widely accepted as the alternate keyboard for the Apple II, II + and IIe computers*, the popular EKM1 now features a new overlay system and printed overlays.



- Permits use of virtually all software.
- Each key holds up to 40 characters. Custom keyboards are easily created and changed thru use of overlays and corresponding software; an unlimited number of these can be stored on disk for future use.
- Large key size is ideal for young children, motor and sight impaired, and retarded users. Keyboard measures 14.3" x 21.25" x 5".
- Permits full computer use with one hand or headwand, plus many other adaptive features.
- Voice output compatible with [redacted] for under $150 via Echo II (Street Electronics).
- Hundreds in use. Field proven since 1980.
- 30-day trial period. One year guarantee.
- Affordable—now includes cable, new overlay system and printed overlays.

For more information contact:

Unicorn Engineering Co.
6201 Harwood Ave.
Oakland, CA 94618

Phone: (415) 428-1626

*Unicorn Adaptive Software Cardinal Adaptive Peripherals. Apple is a trademark of Apple Computer Inc.

Handout #D-52

INTROVOICE

The IntroVoice System for the Apple family of computers requires skill on the part of the installer. If you have never removed integrated circuits or taken off the case that covers the Apple, seek assistance with the installation procedure.

The software that comes with the system is fully menu-driven. That is, each selection choice is listed for each part of the operation procedure. However, it is still necessary to read the User's Manual thoroughly and to practice the operation several times before using it with a student.

The first task to complete when you start using the system is to make backup copies of the two disks that come with the system, and store the originals as archival copies. The two disks that come with the system are:

INTROVOICE I STANDALONE DEMO
INTROVOICE I SYSTEM MASTER

For information about making backup copies, see Section B in Module 5.

Then obtain a copy of the INTROVOICE STARTUP diskette available in the Apple Public Domain collection of diskettes provided to all FDLRS Centers by Project CAISH.

INTROVOICE I STANDALONE DEMO

The STANDALONE DEMO is designed to guide the user through an automatically driven training session that lets the user train the computer to recognize her voice.

For most workshops, use of the STANDALONE DEMO disk will be sufficient.

INTROVOICE I STANDALONE DEMO

To become familiar with the IntroVoice system, run the STANDALONE DEMO disk one or more times. The demo disk is set up so that the computer selects all the menu options and progresses until the user reaches the portion of the program that requires the user to train the computer to her voice pattern. Unfortunately, the computer progresses through the demo very rapidly and does not allow the user time to read or study the various menu options, therefore, it is essential to read the User's Manual. Once the user reaches the voice pattern training program, approximately nine words are displayed which the user must repeat an average of three times each. This process "trains" the computer to recognize the user's voice print.

The nine words which the computer uses for the demo on voice patterns are:

color bar	correction	red
restart	hello	blue
yellow	exit bar	green

Introvoice (CON'T)

STANDALONE DEMO

While using the demo disk, the user cannot save her voice pattern but she can use it in a short program which follows the training session. The computer asks the user to repeat the words previously used in the training session. As the user says the word, it appears in print form on the screen. When the word 'color bar' is spoken, the screen changes to a blank screen with four gray color bars at the bottom of the screen. If the user says 'green", a green color bar will appear at the top of the screen. If the user says 'blue', a blue color bar will appear beneath the green bar, and so forth.

The INTROVOICE I STANDALONE DISK is designed to introduce users to the function of voice recognition. It may be sufficient for many workshop participants to just use this disk to gain a general understanding of the technology.

INTROVOICE I SYSTEM MASTER

The SYSTEM MASTER allows the user to create a vocabulary list and train a user's voice pattern to that specific vocabulary. Once these two operations are completed and saved to the INTROVOICE STARTUP diskette, almost any software program can be booted into memory and run using the IntroVoice system as input, replacing the need for the keyboard. Before starting the procedure complete the following:

1. Make a backup copy of the INTROVOICE I SYSTEM MASTER.

2. Place a write-protect cover over the write-protect notch.

3. Make a backup copy of the INTROVOICE STARTUP diskette.

4. Run the commercial or public domain software that you will be using with the student and make a complete list of all the words and commands needed to operate the program.

   For the purpose of this exercise, the Apple public domain programs, BLOCKS MATH I and FIREORGAN, have been selected for vocabulary training. The two public domain programs are available at each FDLRS Center from the collection of software provided by Project CAISH.

   Make backup copies of BLOCKS MATH I and FIREORGAN for use during the workshop.

   The list of vocabulary needed for these two public domain programs is provided below:

CORRECTION

A;A	B;B	C;C
D;D	E;E	F;F
G;G	H;H	I;I
J;J	K;K	L;L
M;M	N;N	O;O
P;P	Q;Q	R;R
S;S	T;T	U;U
V;V	W;W	X;X
Y;Y	Z;Z	ONE;1
TWO;2	THREE;3	FOUR;4
FIVE;5	SIX;6	SEVEN;7
RETURN;<0D>	NINE;9	ZERO;0

When a key, symbol, word or command is identified for vocabulary training, it is followed by a semi-colon and the key on the computer that is designated as its representative.

Select keys such as RETURN have a designated code as their representative. Check the back of the User's Manual for a sample listing of the codes.

To create, train and use a vocabulary list for a specific user's voice pattern, three menus are important. Each of the three menus is accessible from the MAIN MENU which first appears on the screen.

```
#     _ _ _ _ M E N U _ _ _ _ _ _ _ _ _ _ _ _ _

1     BUILD AND EDIT VOCABULARY
2     TRAIN VOCABULARY
3     RECOGNIZE VOCABULARY
4     TEST VOCABULARY
5     DEMONSTRATION
6     QUIT THE VOICE UTILITY
-     - - - - - - - - - - - - - - - - - - - - - - -

TYPE MENU NUMBER
```

Menu options 1, 2, and 3 are used in sequence when a new vocabulary list must be developed.

Begin with Menu 1 - BUILD AND EDIT VOCABULARY.

```
          BUILD & EDIT VOCABULARY
          ***********************
#     _ _ _ _ M E N U _ _ _ _ _ _ _ _ _ _ _ _ _
1     BUILD NEW VOCABULARY
2     LIST VOCABULARY
3     EDIT VOCABULARY
4     SAVE VOCAB. ON DISK
5     READ VOCAB. FROM DISK
6     LIST DISKETTE FILES
7     LIST FILES NAMES FROM DISK
8     EXIT
-     - - - - - - - - - - - - - - - - - - - - - - -
```

Select Option 1 - BUILD NEW VOCABULARY. The screen will then prompt the user to type in the word to be spoken which must be followed by a semi-colon and the key replacement.

EXAMPLE:

FILENAME: ALPHA/NUMERIC

```
#     SPOKEN WORD                ;KEY REPLACEMENT
      ;NODE
01    CORRECTION:
02    A;A
03    B;B
04    ONE;1
05    TWO;2
06    RETURN; OD
07
```

When you have listed all the vocabulary, hit RETURN twice. The program will return the user to the BUILD & EDIT VOCABULARY sub-menu.

At this time, it is recommended that the user select option 2- LIST VOCABULARY to proofread the vocabulary list. If there are mistakes that need to be corrected, select option 3 - EDIT VOCABULARY.

Once the vocabulary list is correct, select option 4 - SAVE VOCAB. ON DISK. This is a critical step because it stores the vocabulary list on the diskette for use in other portions of the program. Select option 8 to exit from the BUILD & EDIT VOCABULARY sub-menu and return to the main menu.

The main menu will now be on the screen.

#	M E N U
1	BUILD AND EDIT VOCABULARY
2	TRAIN VOCABULARY
3	RECOGNIZE VOCABULARY
4	TEST VOCABULARY
5	DEMONSTRATION
6	QUIT THE VOICE UTILITY

Select option 2 to go to the sub-menu TRAIN VOCABULARY. If a teacher is using this program with a student, the vocabulary file can be completed prior to the voice recognition training session, however, the user of the system MUST BE PRESENT for the voice recognition training session so that his or her voice pattern will be stored on the diskette. When the user selects option 2 from the main menu, the sub-menu TRAINING VOCABULARY appears on the screen.

TRAIN VOCABULARY
****

#	M E N U
1	LOAD VOCAB. TO THE AVIM
2	NEW TRAINING
3	ADDITIONAL TRAINING
4	SAVE VOICE PATTERNS ON DISK
5	LOAD VOICE PATTERNS FROM DISK
6	RETRAIN SINGLE WORDS
7	LIST ACTIVE AVIM VOCABULARY
8	LIST FILE NAMES ON DISK
9	EXIT

The menu options 1, 2, and 4 are the most important for the initial training session. If a user has difficulty pronouncing the vocabulary list or select words in the vocabulary list then options 3 and 6 can be used for additional training.

IT IS IMPORTANT TO PRONOUNCE THE WORDS IN A NATURAL VOICE, striving for consistency in loudness and utterance.

Be sure the microphone has been plugged in properly and that the switch is turned to "on" before beginning the training session.

Select menu option 1 - LOAD VOCAB. TO THE AVIM. The user must know the name of the vocabulary file and the disk drive on which the file is stored. If the user is not sure of the file name or its exact spelling, select option 8 - LIST FILE NAMES ON THE DISK.

When the file name has been loaded into the AVIM, a message will appear on the monitor and the user is prompted to hit any key to return to the TRAIN VOCABULARY sub-menu. Select option 2 - NEW TRAINING. The monitor will prompt the user with the spelling of the vocabulary words and the user must speak the word into the microphone. The training session consists of sequentially saying each item in the vocabulary list three times. If the VIM does not find a good match between the current voice pattern for the prompted word and the last spoken utterance, it will reprompt the user to pronounce the word again until the VIM finds a consistent pattern.

The user must pronounce the words quickly when they appear on the screen. Less than two seconds are allowed by the computer for each enunciation. TEACHERS MAY WISH TO HAVE STUDENTS PRACTICE THE VOCABULARY LIST BEFORE BEGINNING THE VIM TRAINING SESSION. Be sure students are familiar with the spelling of each word so that they can respond immediately when they see the word on the monitor.

A user does not need to speak English to use the VIM system. Any utterance, sound or foreign language can be read by the IntroVoice AS LONG AS THE USER IS CONSISTENT in using the same sound each time the word appears in the training and use of the system.

When the training session is complete, the computer will return the user to the TRAIN VOCABULARY sub-menu. Select option 4 - SAVE VOICE PATTERNS ON DISK. The computer will prompt the user to type the name of the file and the disk drive designation. It is suggested that the file name be the same as the vocabulary file name and that it be stored on the INTROVOICE STARTUP diskette in Drive 2.

The user may now exit from the TRAIN VOCABULARY sub-menu by selecting option 9. The computer will return the user to the MAIN MENU.

#	MENU
1	BUILD AND EDIT VOCABULARY
2	TRAIN VOCABULARY
3	RECOGNIZE VOCABULARY
4	TEST VOCABULARY
5	DEMONSTRATION
6	QUIT THE VOICE UTILITY

Select option 3 - RECOGNIZE VOCABULARY.

RECOGNIZE VOCABULARY
****

#	MENU
1	RECOGNIZE ACTIVE VOCABULARY
2	LOAD VOICE PATTERNS AND RECOGNIZE VOC.
3	LIST ACTIVE VOCABULARY
4	LIST DISK FILES
5	EXIT

Once a vocabulary list has been created, trained and stored on a diskette, it can be retrieved into the memory of the IntroVoice system for use at any time. If the trained vocabulary is already in the memory of the computer, select option 1 - RECOGNIZE ACTIVE VOCABULARY and proceed to boot an applications program into the memory of the computer. If the system has been turned off between training and use with an applications program, select option 2 - LOAD VOICE PATTERNS AND RECOGNIZE VOC. The computer will ask for the file name and the disk drive designation. A message will appear on the screen indicating that the file is active and will ask the user to hit any key. The computer will exit the Voice Utility Program and enter the Apple II Disk Operating System (DOS)/Applesoft System.

The user can than take an applications program such as BLOCKS MATH I or FIREORGAN and perform a warm boot using the Control, Open Apple and Reset keys. When the program is loaded into memory, it can be activated either by speaking into the microphone or typing from the keyboard in response to the prompts on the screen.

NOTES ON THE USE OF THE INTROVOICE I

1. In training the IntroVoice System, consistent utterances are the most important consideration. Speak naturally.

2. Be sure the microphone is attached properly, and that the microphone is turned to "on" when the system is in use.

3. Store the vocabulary list and the trained vocabulary list to a data disk entitled INTROVOICE STARTUP.

4. Keep a list of file names for vocabulary and trained vocabulary. It is recommended that the trained vocabulary have the same name as the vocabulary list with the extension of the user's initials.

   EXAMPLE: ALPHA/NUMERIC-JC

5. Eighty (80) vocabulary word/phrases can be included in one list.

6. One spoken word can be defined as the equivalent of many keystrokes.

7. Coughing, excessive background noise, a bad cold, etc., can interfere with the IntroVoice's ability to recognize a user's voice pattern. The microphone should be placed the same distance from the lips during each use.

8. One good training session can be used for up to a year before it may be necessary to retrain the same vocabulary list.

9. Continued use of the system will help to "train" the user to a more consistent voice pattern.

10. There are eleven (11) sample vocabularies stored on the disk. Refer to Appendix A for the file names and listing of words.

11. When you select menu options that list stored file names, the prefix "V" will denote vocabulary files. The prefix "VP" will denote voice pattern files.

    The "V" file is used to insert, delete or add to a vocabulary list.

    The "VP" file is used to recognize vocabulary to activate the IntroVoice System.

12. The word CORRECTION is the first word in every vocabulary file. It can be used to erase a wrong answer spoken by the user before she enters the answer into the memory of an applications program. If the word CORRECTION is too hard for a user to pronounce, a substitute can be selected. Refer to the user's manual.

13. When you enter new vocabulary ALWAYS have a semi-colon and a second character string called the KEY REPLACEMENT after the word/phrase to be spoken. EXAMPLE: ONE;1. During vocabulary entry, you can use the arrow keys to position the cursor to correct mistakes BEFORE pressing enter.

14. You can print a list of the vocabulary in any file. This will let the student practice the pronunciation before training the computer.

15. The IntroVoice System can be used by a student to control the computer with voice input.

    It can also be used by Speech and Language Clinicians to train students to develop consistent voice patterns.

16. For non-impaired adults, NEW TRAINING may be sufficient. For all others, at least two (2) additional training passes are necessary. Children classified as non-vocal will probably require more additional training.

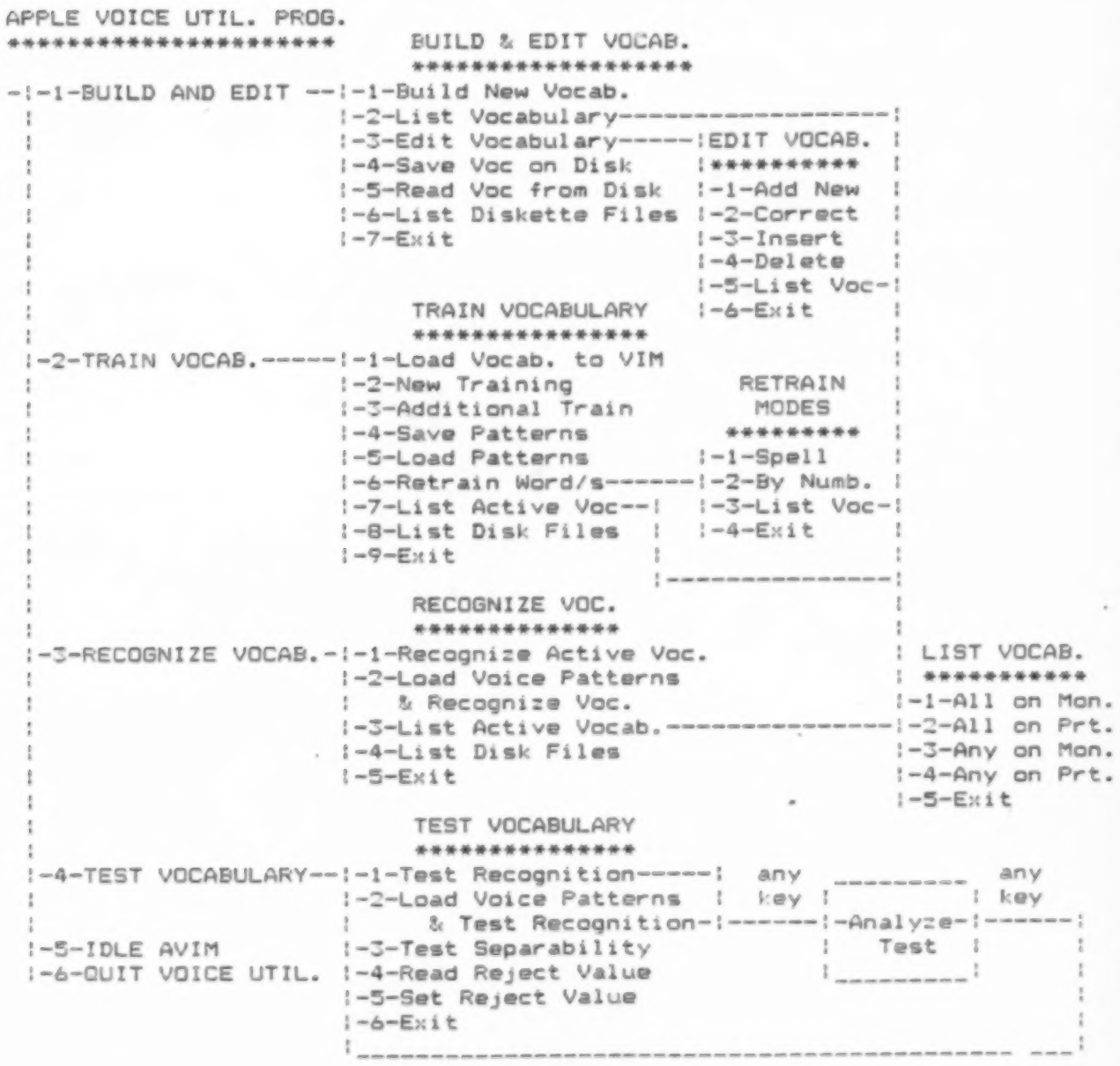
17. If the user encounters an error message during the use of the system, consult the Owner's Manual for the list of Common Error Messages and how to troubleshoot them.

Practice using the IntroVoice I System until you are comfortable with the technology. Be familiar with the System before using it with students.

APPLE VOICE UTILITY PROGRAM

Handout #E-3b

MENU FLOWCHART



BUILD OR EDIT CONTROL KEYS

Keystroke	Hex. Equiv.	
; =	<3B>	=First/second character string delimiter
RETURN=	<0D>	=Ends vocabulary line, goes to next line
-->=	<15>	=Move cursor right one column
<--=	<08>	=Move cursor left one column
CTRL D=	<04>	=Delete one character
CTRL I=	<09>	=Insert one character

The Adaptive Firmware Card Quick Reference Guide

Installing the Card

1. Make sure the computer is turned off.

2. Take off the cover.

3. Connect the cable to the interface through a rear port hole and attach to the *Adaptive Firmware Card* I/O box.

4. Attach the I/O box to the right side of the computer console through the air vents using the screws provided.

5. Plug the interface card into any unused slot except #3 (slot #4 is preferred).

6. Close the computer cover.

7. Installation is now complete. The card must next be initialized to become operational.

Initializing the Card

(When the computer is on and loaded, skip steps 1-5)

1. Open the door on disk drive #1.
2. Take the setup diskette from its package.
3. Insert the disk in drive #1.
4. Close the door on disk drive #1.
5. Turn on the monitor.
6. Turn on the computer. If the computer is on, press <OPEN APPLE>--<CONTROL>--<RESET> instead.
7. Lock into capital letters.
8. When the Main Menu appears on the screen, select INITIALIZATION PROGRAMS by typing 0 and then <RETURN> (zero-not the letter o).
9. When the INITIALIZATION Menu appears on the screen, select MEMORY-LOADER by typing 1 followed by <RETURN>.
10. Once the memory has been loaded, flip the switch on the I/O box to the ON position (toward the red light).
    a. The red light on the I/O box should turn on.
    b. A brief tone should sound.
    c. The STARTUP MENU should appear on the screen.
11. If the STARTUP MENU does not appear on screen:
    a. Double-check the installation.
    b. Repeat the initialization.
12. Open the door on disk drive #1.
13. Remove the Setup disk from drive #1 and insert a program disk.
14. Close the door on disk drive #1.
15. Select a setup area and the disk will automatically boot.
16. Connect a switch or the expanded keyboard to the I/O box of the *Adaptive Firmware Card*

Adaptive Firmware Card Operation - Apple IIe*

I. Installation

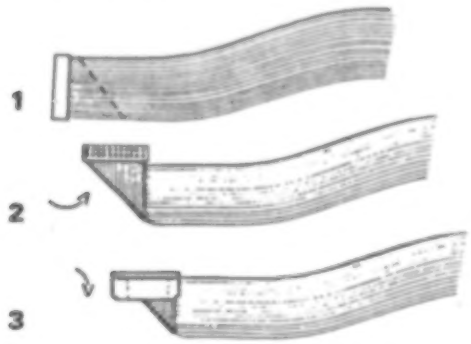
A. Materials

1. Circuit interface card
2. Plastic I/O box with connectors, toggle switch, and cable
3. Velcro adhesive strips
4. SETUP Disk

B. Procedure

1. Make sure computer is OFF.

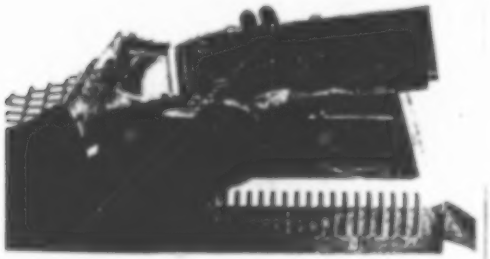
2. Fold end of cable.



3. Thread cable through opening at the back of the computer.

* Please refer to Owner's Manual for complete operating instructions

4. Connect cable to Firmware interface card.



5. Insert card in any unoccupied slot (slot #4 preferred). NOTE: if 80-column card is installed, slot #3 may NOT be used.

6. Attach plastic I/O box to the right side of the computer (Velcro adhesive strips can be used in place of screws provided).

7. Insert SETUP disk in drive and turn on computer. Make sure to make a working backup copy of the SETUP disk. See computer's operating manual for this procedure.

8. From the menu on the screen, select INITIALIZATION.

9. If the Firmware card is in a slot other than #4, run SLOT- RECONFIGURE to configure the SETUP disk for the new slot.

10. Run MEMORY-LOADER to load adaptive routines onto card.

11. Turn ON/OFF switch on the I/O box to ON (toggle switch should point in the direction of the red light).

12. Startup menu will appear on the screen. In most cases select STANDARD/TEMPORARY, then press RETURN.

13. The Method/Rate description will appear at the bottom of the screen. Insert your desired program disk at this point.

14. Enter "A", then press RETURN to change the Method (see appendix for different Methods.

15. Select Method number, press RETURN.

16. Enter "B", press RETURN to change the Rate.

17. Select "0-10" depending upon how fast you want the scanning rate: 10 being the fastest scan. Press RETURN.

18. Press RETURN once more and the program will load.

19. Batteries on the Firmware card will retain the adaptive routines even after the computer is turned off (batteries should be changed once a year). Initialization procedure does not need to be repeated except in the event of memory loss.

II. Change Method/Rate - Computer ON

A. Press CONTROL, "A" and "1" simultaneously. This will take you back to the Method/Rate description.

B. Follow directions I:B14 to 18.

III. Credits

* Adaptive Peripherials, Inc.
  4529 Bagley Aveune North
  Seattle, WA 98103
  (206) 633-2610

Appendix - Input Methods

NUMBER	DESCRIPTION	RATES
1	NORMAL KEYBOARD	
	SCANNING METHODS	1 - 19
2	Regular Scan - Alphabetical	
3	Regular Scan - Statistical	
4	Step Scan - Alphabetical	
5	Step Scan - Statistical	
6	Inverse Scan - Alphabetical	
7	Inverse Scan - Statistical	
	MORSE CODE METHODS	1 - 30
8	Single Switch w Tone Change	
9	Single Switch w/o Tone change	
10	Two Switch - Standard Length	
11	Two Switch - Equal Lengths	
12	Two Switch - Equal Lengths, short space	
13	ASSISTED KEYBOARD	1 - 19
14	PARALLEL ASCII	
15	SERIAL ASCII	1 - 5
0	EXPANDED KEYBOARD	1 - 19

ADAPTIVE FIRMWARE CARD™ WORKSHOP

Handout #F-2

Presented By: Project CAISH

The Adaptive Firmware Card for the Apple IIe is able to control any Apple IIe software in any of 15 modes of operation (Mode 1 is Normal Keyboard.)

Modes 2-7	Scanning Methods
Modes 8-12	Morse Code Methods
Mode 13	Assisted Keyboard
Modes 14-15	ASCII Methods
Mode 0	Expanded Keyboard

The Adaptive Firmware Card is fully programmable via special programs found on the Startup Disk. The following disks are required to take advantage of all of the available options:

1. ADAPTIVE FIRMWARE CARD SETUP DISK - SYSTEM 2.3 - VERSION 2e, October 24, 1985.

2. ADAPTIVE FIRMWARE CARD GAME-SETUP AND DEMO DISK - SYSTEM 2.3 - VERSION 2e, October 24, 1985.

3. THE TALKING (TRANSPARENT) UNICORN, February 18, 1986

4. THE TALKING (NON-TRANSPARENT) WORD BOARD, June 10, 1986

5. UNICORN ONLY SETUP DISK, February 18, 1986

6. THE TALKING SCANNER, February 18, 1986

7. ADAPTIVE FIRMWARE CARD DATA DISK (OPTIONAL)

The next page is a flow chart detailing the various options that are available. Each option will be described in detail in succeeding sections.

Note: For any application requiring use of the Adaptive firmware card, be sure that the disk that you are using has been configured for the proper slot, and that the routines have been loaded onto the card.

Deleting Disk Files:

1. Boot Data Disk - Do not remove it.
2. Type Control-Reset.
3. Type CATALOG.
4. Type DELETE PROGRAMNAME X exactly as it is named in the catalog, for each file you want to remove.

SCANNING

Data Disk Initialization:

1. Boot the ADAPTIVE FIRMWARE CARD SETUP DISK.
2. Select 0 - Initialize A.F.C.
3. Select 3 - Disk-Init.
4. Type space bar to select 'ON' status for Data Disk Option.
5. Type return.
6. Type Y to create a data disk.
7 Put in blank disk.
8. When initialization is completed, remove disk and label it.

Common Steps in Creating a Scan:

1. Boot the ADAPTIVE FIRMWARE CARD SETUP DISK.
2. Select 1 - Create Custom Files.
3. Select 2 - Scan-Create.
4. Swap disks as directed.
5. Select N - New File.

Group-Item Scanning: (usually chosen to scan letters, numbers and symbols.)

6. Select 1 - Define one array. (Plan ahead - if you wanted to have multiple arrays with branching, you must specify them here and now!)
7. Select 2 - Group-Item Scanning.
8. Select 4 - Size of group (arbitrary - for example given.)
9. Type ABC DEF GHI Note: spaces between groups.
10. Type return when done.
11. No modification: type return.

Common Steps in Creating a Scan:

12. Select C - to continue process.
13. Select S - to start over at end of array (arbitrary - for example given.)
14. Select 2 - regular scanning (arbitrary - for example given.)
15. Select 7 - rate (arbitrary - for example given.)
16. Turn AFC switch to on and test array with open-apple key.
17. Type escape when done.
18. Type Y -for yes to save array to disk.
19. Type StudentnameN (ex: Ralp 4)
20. Select L - load & use custom scanning file.
21. Swap disks as directed.
22. Select desired program number.
23. Select method and rate, type return.
24. Type Control-A 3 and return.
25. Type Y to keep present setup.
26. Type StudentnameN and return.

Common Steps in Creating a Scan:

1. Boot the ADAPTIVE FIRMWARE CARD SETUP DISK.
2. Select 1 - Create Custom Files.
3. Select 2 - Scan-Create.
4. Swap disks as directed.
5. Select N - New File.

One-at-a-time Scanning: (usually chosen to scan words.)

6. Select 1 - Define one array. (Plan ahead - if you wanted to have multiple arrays with branching, you must specify them here and now!)
7. Select 1 - One-at-a-time Scanning.
8. Select 7 - Size of scan (arbitrary - for example given.)
9. Type these words; each word starts at an underline; use space bar to move:
   UP DOWN LEFT RIGHT Type return when done.
10. When the cursor is over the U type the up-arrow
    When the cursor is over the D type the down-arrow
    When the cursor is over the L type ESC, S, 3, RETURN
    When the cursor is over the R type ESC, S, 4, RETURN.

11. Display should look like this: ^K ^J ^H ^U Type return.

Common Steps in Creating a Scan:

12. Select C - to continue process.
13. Select S - to start over at end of array (arbitrary - for example given.)
14. Select 2 - regular scanning (arbitrary - for example given.)
15. Select 7 - rate (arbitrary - for example given.)
16. Turn AFC switch to on and test array with open-apple key.
17. Type escape when done.
18. Type Y -for yes to save array to disk.
19. Type StudentnameN (ex: Ralph4)
20. Select L - load & use custom scanning file.
21. Swap disks as directed.
22. Select desired program number.
23. Select method and rate, type return.
24. Type Control-A 3 and return.
25. Type Y to keep present setup.
26. Type StudentnameN and return.

Common Steps in Creating a Scan:

1. Boot the ADAPTIVE FIRMWARE CARD SETUP DISK.
2. Select 1 - Create Custom Files.
3. Select 2 - Scan-Create.
4. Swap disks as directed.
5. Select N - New File.

Super-Simple One-at-a-time Scanning: (To choose the return key only!)

6. Select 1 - Define one array.
7. Select 1 - One-at-a-time Scanning.
8. Select 6 - Size of scan.
9. Type this word:
   RETURN Press the return key when done.
10. When the cursor is over the R type ESC, S, 2, return.

    Display should look like this: ^M
11. Type return.

Common Steps in Creating a Scan:

12. Select C - to continue process.
*13. Select Q - to quit at end of array (arbitrary - for example given.)
14. Select 2 - regular scanning (arbitrary - for example given.)
*15. Select 3 - rate (arbitrary - for example given.)
16. Turn AFC switch to on and test array with open-apple key.
17. Type escape when done.
18. Type Y -for yes to save array to disk.
19. Type StudentnameN (ex: Ralph4)
20. Select L - load & use custom scanning file.
21. Swap disks as directed.
22. Select desired program number.
23. Select method and rate, type return.
24. Type Control-A 3 and return.
25. Type Y to keep present setup.
26. Type StudentnameN and return.

POSSIBILITIES FOR USING SCANNING WITH THE ADAPTIVE FIRMWARE CARD

Handout #F-2d

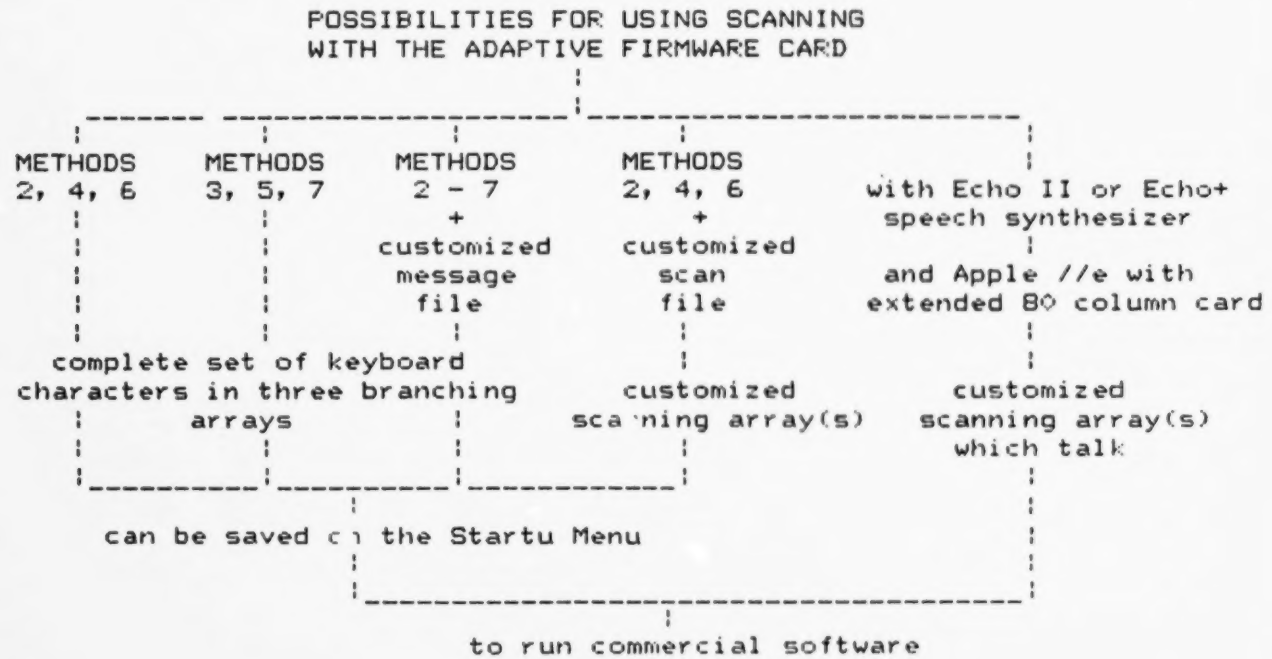
For the standard "alphabetical" layout,
- set AFC method to 2 (regular) or 4 (step) or 6 (inverse)
- method and rate can be saved to Startup Menu for easy access

For the standard "statistical" layout,
- set AFC method to 3 (regular) or 5 (step) or 7 (inverse)
- method and rate can be saved to Startup Menu for easy access

For the standard scanning layout and an added level of messages
- use the Message-Create program on your setup disk to create and save a file of messages
- use the Message-Load program to load the message file
- use this message file with any AFC standard scanning array (2-7)
- this file can be loaded from the setup disk each time needed -or-
- the entire setup can be saved to Startup Menu for easy access

For a redefined scanning array,
- use the Scan-Create program on your setup disk to create and save a file with the special layout
- use the Scan-Load program to load the customized file
- use this customized array via scanning method 2, 4, or 6
- this file can be loaded from the setup disk each time needed -or-
- the entire setup can be saved to Startup Menu for easy access

For a redefined scanning array which "talks,"
- you must have an Apple //e computer with an extended 80 column card and an Echo II or Echo+ speech synthesizer
- your AFC must have System Software 2.3
- use the TALKING SCANNER disk to create and save layouts which generate both text and speech
- load the file from the Talking Scanner disk each time you want to use it (this setup cannot be saved on the Startup Menu)


POSSIBILITIES FOR USING SCANNING
WITH THE ADAPTIVE FIRMWARE CARD
METHODS 2, 4, 6
METHODS 3, 5, 7
METHODS 2 - 7 + customized message file
METHODS 2, 4, 6 + customized scan file
with Echo II or Echo+ speech synthesizer and Apple //e with extended 80 column card
complete set of keyboard characters in three branching arrays
customized scanning array(s)
customized scanning array(s) which talk
can be saved on the Startup Menu
to run commercial software

Initializing a Data Disk

(When the computer is on and loaded, skip steps 1-5)

1. Open the door on disk drive #1.
2. Take the Setup disk from its package.
3. Insert the disk in drive #1.
4. Close the door on disk drive #1.
5. Turn on the monitor.
6. Turn on the computer. If the computer is on, press <OPEN APPLE>--<CONTROL>--<RESET> instead.
7. Lock into capital letters.
8. When the Main Menu appears on the screen, select INITIALIZATION by typing 0 and then <RETURN> (not the letter o).
9. When the INITIALIZATION Menu appears on the screen, select DISK-INIT by typing 3 followed by <RETURN>.
10. Read the DISK-INIT program directions on screen and answer the prompt to Create a Data Disk? with Y or N then press <RETURN> (N returns you to the Main Menu).
11. When the drive stops running:
    a. Open the door on disk drive #1.
    b. Remove the Setup disk.
    c. Insert a blank disk in drive #1.
    d. Close the door on disk drive #1.
    e. Press <RETURN>.
12. When INITIALIZATION is complete, hit any key to continue.
13. Remove data disk - it is now prepared to store special scans, messages, and custom Unicorn keyboard setups.

Re-configuring the *Adaptive Firmware Setup Disk* for a new slot

(When the computer is on and loaded, skip steps 1-5)

1. Open the door on disk drive #1.
2. Take the Setup diskette from its package.
3. Insert the disk in drive #1.
4. Close the door on disk drive #1.
5. Turn on the monitor.
6. Turn on the computer. If the computer is on, press <OPEN APPLE>--<CONTROL>--<RESET> instead.
7. Lock into capital letters.
8. When the Main Menu appears on the screen, select INITIALIZATION PROGRAMS by typing 0 and then <RETURN> (zero - not the letter o).
9. When the INITIALIZATION MENU appears on the screen, select SLOT-RECONFIGURE by typing 0 and then <RETURN>.
10. The program informs you which slot the disk and card are currently configured for (default is Slot #4).
11. If you do not wish to change slots press <N> then <RETURN> (<N> returns you to the Main Menu).
12. If you wish to change slots press <Y> then <RETURN>.
13. Specify the slot you want to use (press the slot number and then <RETURN>).
14. The disk is now reconfigured for the slot selected.
15. When RE-CONFIGURATION is completed, you return to the Main Menu.

Loading Scanning Files onto the *Adaptive Firmware Card*

(When the computer is on and loaded, skip steps 1-5)

1. Open the door on disk drive #1.
2. Take the Setup diskette from its package.
3. Insert the disk in drive #1.
4. Close the door on disk drive #1.
5. Turn on the monitor.
6. Turn on the computer. If the computer is on, press <OPEN APPLE>--<CONTROL>--<RESET> instead.
7. Lock into capital letters.
8. When the Main Menu appears on the screen, select LOAD FILES by typing 2 and then <RETURN>.
9. When the LOAD PROGRAMS Menu appears on the screen, select SCAN-LOAD by typing 3 followed by <RETURN>.
10. When drive stops running:
    a. Open the door on disk drive #1.
    b. Remove *Adaptive Firmware Setup Disk.*
    c. Insert data disk.
    d. Press <RETURN>.
11. Select scanning file to be loaded (by number) then press <RETURN> to accept or <SPACE BAR> to see more selections (if they exist).
12. Hit any key to select input method and rate or <RETURN> to accept present values.
13. Enter new METHOD (2-7) then press <RETURN>.
14. Enter new RATE (0-19) then press <RETURN>.
15. Flip the switch on the I/O box to the ON position (toward the red light).
16. Press <RETURN> again to enter values or any other key to update METHOD and RATE.
17. The scanning array may be tested by pressing the <OPEN APPLE> key or any switch connected to the *Adaptive Firmware Card's* I/O box.
18. Open the door on disk drive #1
19. Remove the Setup disk.
20. Insert the program disk.
21. Close the door on disk drive #1.
22. Press <CONTROL>--<RESET> to boot a program disk with a specialized scan loaded.

Loading Scanning Files from the Startup Menu

(When the computer is on and loaded, skip steps 2-3)

1. Turn on the *Adaptive Firmware Card* (switch on the I/O box.)
2. Turn on the monitor.
3. Turn on the computer.
4. Lock into capital letters.
5. If computer is on press <CONTROL> A then 0 (zero).
6. Select a setup area by number then press <RETURN>.
7. Select an Input-Method (2-7).
    a. Press A then <RETURN>.
    b. Press 0 (Zero) then <RETURN>.
8. Select an Input-Rate (0-19).
9. Open the door on disk drive #1.
10. Take the Program diskette from its package.
11. Insert the disk in drive #1.
12. Close the door on disk drive #1.
13. Connect special switch to the I/O box of the *Adaptive Firmware Card*
14. Press <OPEN APPLE>--<CONTROL>--<RESET>. (If this doesn't work, type PR#6 at the Applesoft prompt and then press <RETURN> or turn off *Adaptive Firmware Card* before booting, then turn back on after booting.) *Example:* to get an Applesoft prompt, press <CONTROL>--<RESET>] (The] is an Applesoft prompt) then type PR#6.]PR#6, then press <RETURN>.

Loading Custom Keyboards onto the *Adaptive Firmware Card*

(When the computer is on and loaded, skip steps 1-5)

1. Open the door on disk Drive #1
2. Take the Setup diskette from its package.
3. Insert the disk in drive #1.
4. Close the door on disk drive #1.
5. Turn on the monitor.
6. Turn on the computer. If the computer is on, press <OPEN APPLE>--<CONTROL>--<RESET> instead.
7. Lock into capital letters.
8. When the Main Menu appears on the screen, select LOAD FILES by typing 2 and then <RETURN>.
9. When the LOAD PROGRAMS Menu appears on the screen, select KEYBOARD-LOAD by typing 3 followed by <RETURN>.
10. When drive stops running:
    a. Open the door on disk drive #1.
    b. Remove *Adaptive Firmware Setup Disk*
    c. Insert data disk.
    d. Close the door on disk drive #1.
    e. Press <RETURN>.
11. Select expanded-keyboard message file to be loaded (by number) then press <RETURN> to accept or <SPACE BAR> to see more selections (if they exist).
12. Hit any key to select input method and rate or <RETURN> to accept present values.
13. Enter new METHOD (0) then press <RETURN>.
14. Enter new RATE (0-19) then press <RETURN>.
15. Flip the switch on the I/O box to the ON position (toward the red light).
16. Press <RETURN> again to enter values or any other key to update METHOD and RATE.
17. Connect the 36 pin plug on the *Unicorn Keyboard* into the jack on the *Adaptive Firmware* I/O box.
18. Insert the overlay, which corresponds to the custom keyboard selected and loaded, between the membrane and the plastic cover.
19. The expanded-keyboard message file may be tested by pressing any active area of the expanded keyboard.
20. Open the door on disk drive #1.
21. Remove the data disk.
22. Insert the program disk.
23. Close the door on disk drive #1.
24. Press <CONTROL>--<RESET> to boot a program disk with a custom keyboard loaded.

Loading Custom Keyboards from the Startup Menu

(When the computer is on and loaded, skip steps 2-3)

1. Turn on the *Adaptive Firmware Card* (switch on the I/O box).
2. Turn on the monitor.
3. Turn on the computer.
4. Lock into capital letters.
5. If computer is on press <CONTROL> A then 0 (zero).
6. Select a setup area by number then press <RETURN>.
7. Select Expanded Keyboard Input-Method:
   a. Press A then <RETURN>.
   b. Press 0 (zero) then <RETURN>.
8. Select an Input-Rate:
   a. Press B then <RETURN>.
   b. Press new Input-Rate (0-19) then <RETURN>.
9. Open the door on disk drive #1.
10. Take the Program diskette from its package.
11. Insert the disk in drive #1.
12. Close the door on disk drive #1.
13. Connect *Expanded Keyboard* to the I/O box of the *Adaptive Firmware Card*
14. Press <OPEN APPLE>--<CONTROL>--<RESET>. (If this doesn't work, type PR#6 at the Applesoft prompt and then press <RETURN> or turn off *Adaptive Firmware Card* before booting then turn back on after booting.) *Example:* to get an Applesoft prompt, press <CONTROL>--<RESET>.] (The] is an Applesoft prompt) then type PR#6.]PR#6 then press <RETURN>.

THE TALKING (TRANSPARENT) SCANNER

The TALKING SCANNER disk allows you to create and use customized scanning arrays that talk. You must use an Apple //e which has (1) 128 K memory, (2) an Adaptive Firmware Card, already installed and initialized, (3) an Echo II or Echo+ Speech Synthesizer, and (4) a single switch or the OPEN-APPLE key.

FOR A DEMONSTRATION

1. Turn the AFC off.
2. Boot the TALKING SCANNER disk.
3. Press 2 <RETURN> (to select the TALK program)
4. Look through the following list to choose a file that matches the software you have available to use:

Name of file	Description	Can be used with
STANDARD	Complete set of keyboard characters, letters in alphabetical order	Any software which looks for keyboard input
STORY MACHINE 1	One array of 4 phrases	STORY MACHINE
STORY MACHINE 2	Two arrays of 4 nouns and two verbs each	STORY MACHINE
A-E	Single letters ABCDE	Any software which requires only ABCD or E as input
NUMB 1-9	Single letters 1 - 9	Any software which requires only 1-9 as input
ARROWS - ALEX THE RABBIT	Rotating arrow	Apple Presents Apple for Apple //e: press ESC, then select Arrows, Rabbits...
UP DOWN - ALEX	Word array: UP DOWN RIGHT LEFT	

5. Select the file you want from the TALKING SCANNER menu. (Type the number, then press <RETURN>.
6. Follow the instructions on the screen.
7. Use a single switch (or the OPEN-APPLE key) to run the software you selected.

TO LEARN HOW TO CREATE YOUR OWN TALKING ARRAYS

1. Boot the TALKING SCANNER disk.
2. Press zero <RETURN> (to select INFORMATION).
3. Press letters to read individual topics or press Z to read all topics.

   If you have a printer connected to your computer, you can press Z (above), then press 2 <RETURN> to print out full instructions.

PERMISSION TO COPY: We strongly urge you to put a write-protect tab on your original disk, to make a copy (see Appendix B in the AFC Manual), and to work only from your copy. Permission to make copies for other AFC users is granted, if not for resale.

adaptive peripherals, inc.

4529 bagley ave north • seattle, wa 98103
(206) 633-2610

PRODUCT INFORMATION: THE ADAPTIVE FIRMWARE CARD

The Adaptive Firmware Card allows users with physical disabilities to run off-the-shelf software for their Apple® IIGS, IIe, or II+ computer (from educational programs such as Logo to business-oriented software such as AppleWorks®) using any of 16 special-input methods. These methods include SCANNING for single-switch users, MORSE CODE for two-switch users, EXPANDED KEYBOARD capabilities for direct selectors, and ASSISTED KEYBOARD for people using the Apple keyboard with a single finger or headwand.

Two additional features, SLOWDOWN and GAME PADDLE EMULATION, permit many commercial paddle-based programs to be played by means of one or two switches.

Different versions of the AFC are available for the Apple IIGS, IIe, and II+. The cards for the Apple IIGS and IIe are easily installed by a non-technical person. The card for the Apple II+ is a modified version of the card for the Apple IIe; installation requires changing a few chips on the motherboard of the Apple II+ computer and connecting two flywires.

A more complete description of the card is attached.

The Adaptive Firmware Card, complete with input/output box, disks of special-feature software, and operations manual is available at the following prices (U.S. dollars):

Model G32	(for the Apple IIGS)	$400
Model 2e	(for the Apple IIe)	$400
Model 2	(Model 2e modified for the Apple II and II+)	$400

From: Adaptive Peripherals, Inc.
4529 Bagley Avenue North
Seattle, Washington 98103
(206) 633-2610

Purchase orders are accepted. The price includes routine shipping costs within the U.S.A. Please allow 4-6 weeks for delivery. On overseas orders, we require payment in advance in US dollars plus $15 per card shipping costs.

The Adaptive Firmware Card is sold with a 30-day money-back guarantee and is warranteed for one year against defects in parts and labor.

In Canada, our exculsive dealer is:

TASH, Inc.
70 Gibson Drive, Unit 12
Markham, Ontario L3R 4C2
(416) 475-2212

THE ADAPTIVE FIRMWARE CARD: for the Apple IIGS, IIe, or II+

INPUT METHODS

The Adaptive Firmware Card allows users with physical disabilities to run standard, unmodified software for the Apple® II computer (such as AppleWorks®, Logo, Stickybear™ ABC's, etc.) using any of 16 special-input methods. These are:

1	NORMAL INPUT	For use with game button- and switch-input software.
2-3	REGULAR SCAN	Single-switch traditional scanning. Alphabetical and speed-oriented groupings are available.
4-5	STEP SCAN	Each press of a single switch causes the cursor to move to the next item. A pause indicates choices.
6-7	INVERSE SCAN	The cursor moves while a switch is held closed. To select an item, release the switch and wait, or release the switch and press a second switch.
8-9	MORSE CODE 1	Single-switch Morse code. Long and short switch closures form *dit* and *dah*. Optional tone change provides feedback.
10-12	MORSE CODE 2	Two-switch Morse code (automatic keyer). Variations in tone lengths available.
13	ASSISTED KBD	Adds shift, control, and repeat key functions to the Apple keyboard for one-finger typists and headwand users.
14-15	ASCII INPUT	For use with certain portable communication devices (e.g. Light Talker, Touch Talker, Express)
0	EXPANDED KBD	For use with expanded or miniature keyboards (e.g. Unicorn Expanded Keyboard or TASH King or Mini Keyboards) or a matrix of switches connected to a multiple switch box.

All scanning methods use the Apple's own visual display. The second-to-bottom line of text or graphics is replaced by the scanning array when the switch is pressed. The line is restored after a character has been selected.

HARDWARE The complete interface consists of a specially designed printed-circuit card that is inserted in any slot of the Apple and a small plastic input/output box that snaps onto the de of the computer.

The input/output box contains an on/off switch, two mini-phone jacks, and a 36 pin conector. The mini-phone jacks allow connection of 1-2 switches (not included). The 36 pin connector allows connection of an expanded keyboard, multiple switch box, or communication device (not included). Switch input through the Apple's Game I/O will function in parallel to switches connected through the I/O box.

INSTALLATION The cards for the Apple IIGS and Apple IIe are easily installed by a non-technical person; installation time may be as little as one minute.

The Adaptive Firmware Card for the Apple II+ is a modified version of the card for the Apple IIe. Installation requires inserting the card in any of the slots inside the Apple II+ and changing a few chips (provided with the card) on the logic board of the Apple II+. This can be done easily by a knowledgeable computer person in a few minutes.

ADDITIONAL FEATURES A number of additional features are available to enhance the use of the computer through the AFC input methods. These include:

REPEAT FUNCTION	Allows a character to be repeated by holding down a switch or key.
MESSAGING	Allows one of approximately 40 words or phrases to be accessed by a two-character code. These user-defined messages are loaded onto the card from disk and may be saved on the card itself.
SLOWDOWN	Permits programs with a real-time component to be slowed down without interfering with disk operation or sound effects.
PADDLE EMULATION	Permits some commercial paddle-based games and educational programs, such as Stickybear Shapes and The Edmark Reading Program, Level 1 Software, to be operated by means of one or two switches.
CUSTOMIZED OVERLAYS	Permits creation of new overlays for use with an expanded/miniature keyboard or multiple switch box and creation of new arrays for use in scanning (including whole-word capability).
REDEFINED OVERLAYS	Permits rearranging of keys on the Apple keyboard, redefining of codes in Morse code, or redefining of characters in ASCII input methods.
SLOW-LIST	AFC software includes a set of messages useful for programming (e.g. 'CATALOG'). The message 'slow-list' sends the message 'LIST' to the Apple and simultaneously causes the card to enter slowdown mode.

COMPATIBILITY

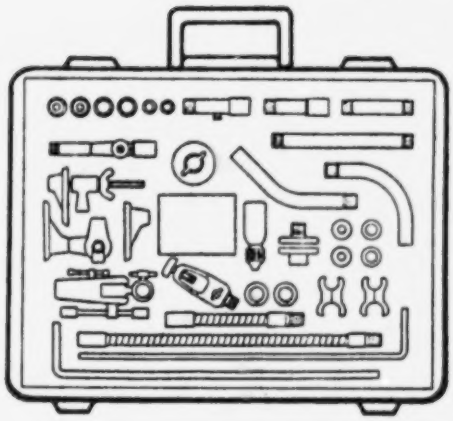
AFC Model G32.....Works only in the Apple IIGS. Future software is planned to allow this card to work in the Apple IIe. Will not work with CP/M®.
AFC Model 2e.....Works only in the Apple IIe. Will not work in the Apple IIGS.
AFC Model 2.....(Model 2e modified for Apple II and II+) Works only in the Apple II and II+ but can be upgraded to work in the Apple IIe, if desired.

Zygo Switch Kit

The Switch Kit includes a varied sampling of standard preferred single switch controls. The KIT additionally provides assorted cables, including an extension cord and open ended cable with standard connector for making custom switches which will adapt to ZYGO devices.

Zygo Adaptive Fixtures Kit

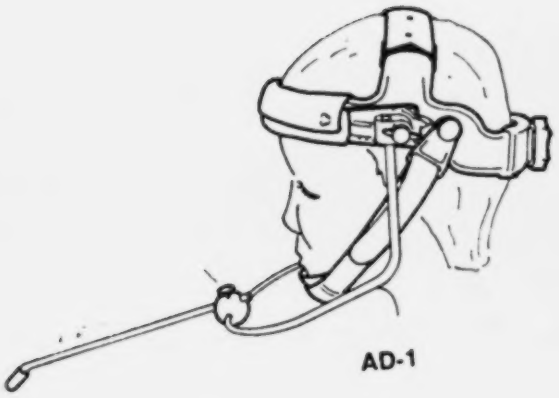
The ZYGO Adaptive Fixtures "program" emanates from an essential core KIT of multi-purpose pieces and parts. It is designed to be used in either of two ways:



- As a continuing replacement program where each need is met "on the spot," sent on with the user and refill parts ordered as necessary.
- As an evaluation tool, where the parts never leave the KIT. Rather, mountings are experimented with, a particular configuration determined, and an individual's prescribed mounting ordered out for drop-shipment from the factory. It then has to be assembled when received per the original prescription. This is the least favored approach, however, because of the lengthy delays the user may incur in order processing and lost training/mastery time.

Remember, too, that proper mountings affect the success of preliminary device testing, evaluation and training as well as long-term or permanent use.

The KIT contains selected quantities from the total Adaptive Fixtures parts listing.



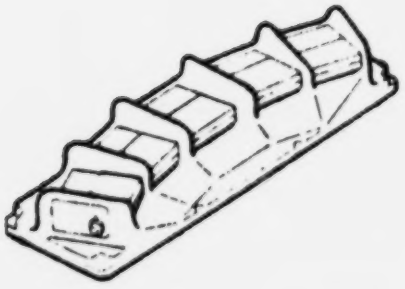
AD-1

Head Pointer

AD-1 Standard Pointer
This head-worn pointer provides efficient pointing from a psychologically and cosmetically sound perspective: the chin. Unlike forehead protrusion pointers, using an "out from the chin" device more realistically places the pointer in proximity to the item(s) being accessed. It also eliminates the unsightly barrier imposed by forehead pointers because it doesn't interrupt either the wearer's field of vision or the full view of the wearer's face. This unit is fully adjustable; capable of being individually fitted to head sizes from 20-25 inches in circumference.

Characteristics

. Lightweight aluminum and plastic construction.
. Fully and independently adjustable headband and yoke/pointer assemblies.
. Comfortable forehead and back cushions.
. Adjustable chin strap available in two colors (brown/beige); specify when ordering.
. Translucent, conforming soft plastic chin cup.

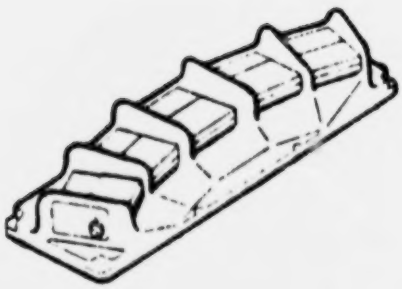


C1-2 Slot Selection* (100)

This alternative control is used for Directed Scanning of the Model 100 Communication System. It causes a single message light to move omni-directionally throughout the board. Prescribed for athetoids with multiple switch actuation ability and/or others who are negatively affected by the strobing of Row/Column Scanning.

Characteristics

. Four individually mounted ZYGO CM-1 Tread Switches control light movement directions. A fifth, ENTER, activates secondary operation functions: ALARM, MEMORY, AUX output devices.



Characteristics (Continued)

- The switches are arranged, and individually recessed, in a slotted arc pattern to secure the user's arm or foot while making selections.
- A single switch actuation moves the light one message area. Maintained switch closure causes the light to scan in the selected direction.
- Scan speed is adjustable.
- Switch direction assignments are changeable.
- The base of this Control is a metal mounting plate covered with a non-skid foam rubber pad.
- Comes with a CA-5 Connecting Cable.

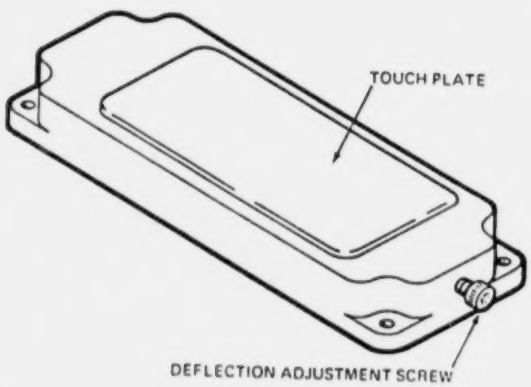
Options

- Model CL-A has 5 mini-jacks in rear of unit for evaluation of other switch combinations.
- Model CL-2-Al has the 5 mini-jacks and a 7-pin DIN jack for evaluation of other switch combinations.

Size: 19" x 6" x 3" (48 x 15 x 8 cm) **Weight:** 4lbs. 8 oz. (2 kg)

*Design concept by Rehabilitation Engineering Center, Children's Hospital at Stanford (Palo Alto, CA).

CM-4 Touch Switch



- This ultra-sensitive switch is for persons having virtually imperceptible motor-ability (distal tip of fingers or toes, voluntary muscle contraction in hands, legs, throat, on the face, etc.).
- An adjustment screw is used to sensitize the touch plate to reduce the amount of travel required for actuation. The switch is normally open and actuated by depressing the touch plate. It remains closed until the actuating force is removed.
- Four holes, accepting a variety of machine screws, are provided for mounting.

CM-5 Touch Switch (Continued)

Force: 3 oz. (0.08 kg)
Travel: 1/64" (0.04 cm)
Feedback: N
Material: Plastic
Connection: Mini-phone jack
Size: 3-3/4" x 1-1/2" x 1/2" (10 x 4 x 1 cm)
Weight: 1 oz. (0.03 kg)

CM-5 Thumb Switch

- This switch is cupped in the palm of the hand and actuated by depressing the raised button with the thumb; much as with conventional, hand-held nursing call buttons.
- The switch is normally open. It remains closed until the actuating force is removed.

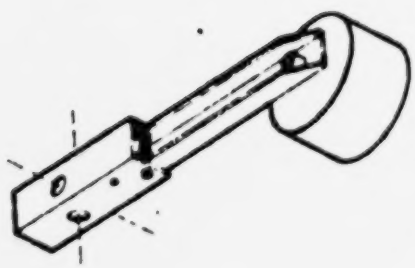
Force: 20 oz. (0.06 kg)
Travel: 3/32" (0.24 cm)
Feedback: T
Material: Plastic
Connection: Phono-jack
Size: 3-1/2" x 1-1/4" x 3/4" (9 x 3 x 2cm)
Weight: 1 oz. (0.03 kg)

CM-7 Short Leaf Switch

- Same as CM-2 above except for shortened length of leaf.

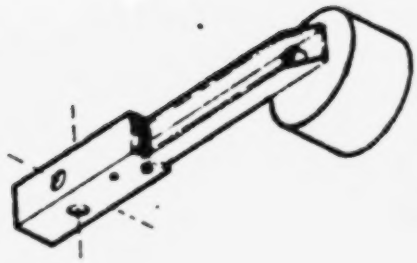
Force: 4 oz. (0.1 kg)
Travel: 3/16" (0.48 cm)
Feedback: N
Material: Vinyl sleeve over copper reeds
Connection: Mini-phone jack
Size: 3-3/4" x 1-3/4" (10 x 5 x 1 cm)
Weight: 1 oz. (0.03 kg)

CM-9 Lever Switch*



- This snap-action switch was developed specifically for access by either a lateral or rotating head motion. It is frequently used in pairs for side-to-side head motion where two separate switch functions are required (i.e., wheelchair or environmental control, morse code, etc.).
- Minimal travel is required for actuation with a physical stop at 1/8". There is no flex or overtravel with this switch. Any excess force against the switch is applied directly to its mounting.

CM-9 Lever Switch* (Continued)

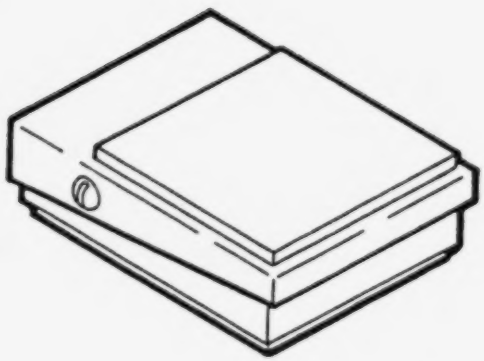


- The switch housing allows attachment to a 1/4" D rod from either of two orientations; concentric with, or perpendicular to, the moment of force. Both wing and locking nuts are supplied.
- Pre-packaged stabilization systems are available (see ADAPTIVE FIXTURES: CM-9-2A).

Force: Adj. 4-8 oz. (11-23 kg)
Travel: 1/16" (0.2 cm)
Feedback: A/T
Material: Replaceable foam pad cover; aluminum housing
Weight: 4 oz. (0.11 kg)
Connection: Mini-phone jack
Overall Length: 7" (17.8 cm)
Pad Diameter: 2-1/2" (6 cm)

*Developed by Al Ross, CDMRC, University of Washington (Seattle, WA).

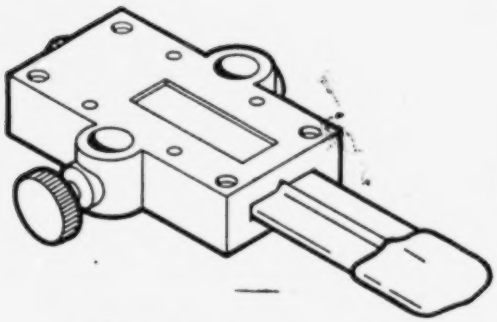
CM-1 Tread Switch

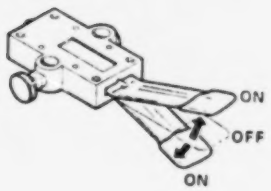


- This is the most versatile and practical of all ZYGO operating controls; providing critical multi-sensory feedback: auditory/tactile.
- Meeting nearly 85% of all clients' physical abilities, it is suitable for use with almost any voluntary, reliable motor action (head, chin, elbow, hand, knee, foot, etc.).
- The switch is normally open and is actuated by depressing the treadle. It remains closed until the treadle is released.
- The center of the contrasting target area requires less than 5 oz. of applied force for switch actuation, but will also withstand severe pounding and general abuse without damage.
- The bottom of the switch has a 1/4-20 threaded nut for mounting.

Force: 5 oz. (0.15)
Travel: 3/16" (0.5 cm)
Feedback: A/T
Material: Metal with foam rubber surface and base
Connection: Mini-phone jack
Size: 2-3/4" x 3-1/2" x 1" (7 x 9 x 3 cm)
Weight: 7 oz. (0.2 kg)

CM-2 Leaf Switch

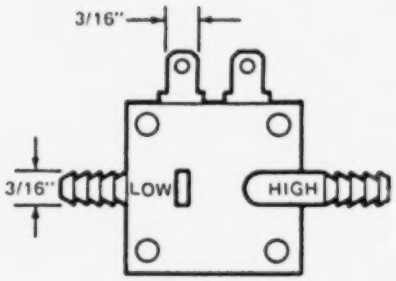




- This is a two-way deflection switch. The lea is encased in a soft, non-abrasive red vinyl sleeve for use in tight access areas (between upper or lower arm and trunk, thighs, knees, under the chin, etc.).
- Not recommended for use where auditory or tactile feedback is required by the user to know the switch has been actuated and released, or where athetoid behavior is present at the actuation site.
- The switch is normally open and is actuated by deflecting the leaf. It remains closed until the deflection force is removed.
- The base of the switch is a block with locking screws for 1/4" D rod mounting and has holes which will accept a variety of mounting screws.

Force: 1 oz. (0.03 kg) **Connection:**
Travel: 3/4" (1.9 cm) Mini-phone jack
Feedback: N **Size:** 6-1/2 x 1-3/4"
Material: Vinyl sleeve x 1/2"
over copper reeds (17 x 5 x 1 cm)
Weight: 1 oz. (0.03 kg)

CM-3 Pneumatic Switch



- Commonly known as the "sip or puff" switch, this ultra-sensitive control is actuated by the slightest mouthed air pressure (pursing the lips, tongue movement, etc.).
- Tubing connects to the HIGH port for puff actuation or LOW port for sipping. Connecting two switches piggyback style allows the user dual switch operation with a single mouth tube.
- For holes accept #2 screws. An adhesive pad is provided for mounting.

Pressure: 0.02 psi (1 cm of water) **Connection:** 3/16" Slide terminals
Feedback: N **Size:** 2-1/4" x 1-1/2" x 1/2" (5 x 4 x 1 cm)
Material: Plastic **Weight:** 1/2 oz. (0.02 kg)

CM-3-2 Pneumatic Switch with Squeeze Ball

- Same as CM-3 above, but with additional squeeze ball for persons who can manage only a very slight squeezing action.
- The ball is connected to the switch with a length of tubing. The shorter the tubing, the less squeeze pressure required. If the user's squeeze is excessive, slit the tubing to allow air to escape.

Pressure: See CM-3
Feedback: N
Connection: See CM-3
Ball Size: 2-1/4" x 1-5/8" D (6 cm L x 4 cm D)
Ball Weight: 1 oz (0.03 kg)
Ball Material: Rubber

VENDORS OF ADAPTED SWITCH OPERATED TOYS

The following companies manufacturer or distribute adapted, switch operated toys. Each company sells a variety of switches which can be used for battery operated and electrically operated devices.

ADAPTIVE AIDS, INC.
3721 East Aviation Highway, No. 7
Tuscon, AZ 85713

EDUCATIONAL TECHNOLOGY CENTER
P. O. Box 64
Foster, RI 02825

HANDICAPPED CHILDRENS TECHNOLOGICAL SERVICES, INC.
P. O. Box 7
Foster, RI 02825

LINDA J. BURKHART
8503 Rhode Island Avenue
College Park, MD 20740

MICROSWITCH DESIGNS
P. O. Box 1863
Des Moines, IA 50306

PRENTKE ROMICH COMPANY
1022 Heyl Road
Wooster, OH 44691

TOYS FOR SPECIAL CHILDREN
101 Lefurgy Avenue
Hastings-On-Hudson, NY 10706

PARENT CRITERIA FOR TOYS

The following criteria should be considered as you choose toys and activities:

Do they meet the requirements of those using them as to size, form, indoor-outdoor possibilities and the need for both learning and sheer fun?

Do they interest children?

Do they adapt to more than one purpose, more than one child, or more than one age level?

Do they withstand hard use?

Do they comply with safety standards?

Do they encourage action which can be completed in a relatively short time for young children or challenge the ingenuity and perseverance of older ones?

Do they help the child gain some competence for living in the world?

Do they build a variety of understanding at each child's level?

Do they contribute toward his readiness for the next step in his growth?

Do they invite exploration of the arts and sciences?

Do they develop strength and skill together with eye-hand coordination?

Do they help to strengthen good relationships with other people?

Do they offer opportunity to converse and correspond with others?

Do they provide for both social and independent activity?

Do they arouse wonderment, imagination, or creative thinking?

Do they suggest experimentation?

Do they help children clarify their experiences?

Do they make possible opportunities for children to feel good about themselves as they do their own thinking?

Do they justify their cost?

Do they compare favorably in price to similar articles?

Do they represent what the manufacturer claims in ease of assembling and using?

HOMEMADE ADAPTED TOYS AND SWITCHES

Battery operated toys that have been commercially adapted for switch input can be very expensive. Likewise, purchasing commercially produced switches can be very costly. Two books by Linda J. Burkhart provide detailed, illustrated directions for adapting toys and making switches from common, household items. The two books are:

Homemade Battery Powered Toys and Educational Devices for Severely Handicapped Children, 1980. ($6.00)

More Homemade Bettery Devices for Severely Handicapped Children with Suggested Activities, Revised 1985. ($12.50)

Both books are available from:

Linda J. Burkhart
6503 Rhode Island Avenue
College Park, Maryland 20740

To demonstrate how to construct a homemade switch, directions for a KNEE SWITCH have been provided. The KNEE SWITCH was developed by Sandra Buchanan, a parent from Madison County, Florida and was used in workshops conducted by the Instructional Technologist at FDLRS/Gateway.

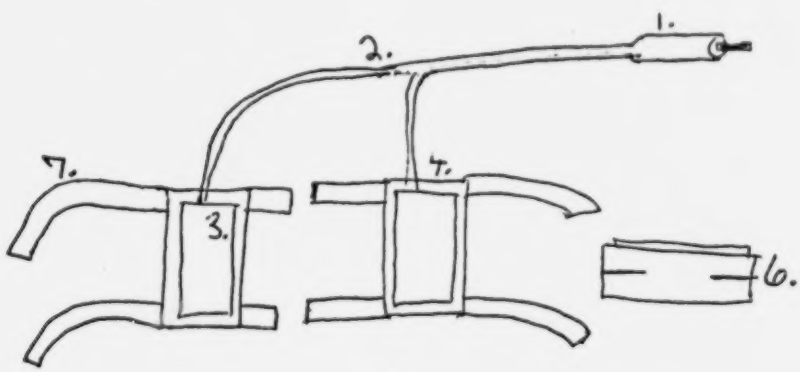
It is recommended that workshop participants reference the above resource books for detailed directions on the techniques and skills used to construct the switch.

Knee Switch

This switch is used to encourage a child to use her leg muscles. A part of the switch is strapped to each leg. When the legs are pulled together, the switch is connected and will activate a toy.

Materials needed

2 pcs. of foam, 2" X 2" X 4"
2 pcs. of thin copper, 1½" X 3½"
1 - 3' of 22 gauge stranded wire
1 subminiature size plug
4 velcro straps about ½" X 10"
double face tape
rosin core solder
soldering iron



1. Solder plug on one end of wire and test.

2. Split the other end of wire about 16" and strip about 1".

3. Tape all edges of copper to avoid any sharp edges. Use about 1/4" of the tape on front side of copper.

4. Solder each wire to the back of the copper pieces.

5. Use double face tape to tape copper to the center of the foam.

6. On the ends of the foam, cut at mid way a ½" slit to place the velcro.

7. At mid way of each piece of velcro strap, wrap double face tape around it. Now, place the straps in the slits of the foam.

CSEC SERVICE

The CSEC service provides parents, teachers and therapists an opportunity to get answers to questions they have regarding the non-verbal student's communication needs. The interdisciplinary team focuses their evaluation upon determining the most effective augmentative communication system (e.g., signs, picture/symbol boards) that the student is capable of using. In addition, team members identify strategies which would facilitate the student's use of an augmentative system. These strategies include:

- proper positioning when appropriate
- efficient accessing of vocabulary
- when necessary, methods of enhancing motoric, sensory, linguistic and cognitive development
- developing spontaneous usage of the system
- integrating the system into the classroom setting

Parents and school personnel are encouraged to observe the evaluation process. At the end of the evaluation day, the team sits down with the parents and any visitors to answer questions and discuss their recommendations. Follow-up is available to assist in clarification and/or assistance with CSEC recommendations. The evaluation and follow-up service are free of charge.

INDICATORS OF EVALUATION NEED*

1. A student who demonstrates the intent to direct the behavior of familiar and unfamiliar persons but has limited ability.
2. A student who has limited motor and sensory ability to indicate a choice.
3. A student FRUSTRATED by inability to communicate.
4. A student with noticeable discrepancy between receptive and expressive communication abilities.
5. A student whose speech is intelligible to familiar persons but requires a "back-up" communication system to supplement speech to unfamiliar people.
6. A student with pre-readiness or higher academic skills present but no reliable output.

*A student demonstrating any one of the above indicators should be referred to the CSEC.

COMMUNICATION SYSTEMS EVALUATION CENTER

FOLLOW-UP FOLLOW-UP FOLLOW-UP FOLLOW-UP FOLLOW-UP

DO YOU . . . . . .

Need clarification of report recommendations?

Have questions about the team's findings?

Need help in constructing a device or formating a vocabulary?

Require assistance in implementing the recommendations? . . . . . .

If you need answers to these or any other questions about the evaluation report, the CSEC staff is available to help. For simple problems, a phone call to the Center may be sufficient and we will do our best to clear up the problem. If the problem is more involved, you may request an on-site follow-up visit from one or more of the CSEC staff.

WHAT IS A FOLLOW-UP?

A follow-up is an in-depth effort by the CSEC to help resolve problems that might have been encountered in implementing evaluation recommendations. In some cases an on-site visit may be required. This and any other follow-up service is completed at no charge.

HOW DO WE REQUEST A FOLLOW-UP?

To request a follow-up, it is required that you contact the local education agency (LEA) designee. This person is the referring agent in your school district, more than likely the same person you contacted for the initial evaluation referral.

HOW LONG WILL IT TAKE TO RECEIVE FOLLOW-UP SERVICE?

Follow-up visits can normally be scheduled within a few weeks to one month after the referral is received by the CSEC.

REMEMBER . . . . .

The CSEC is only a phone call away. Feel free to call and discuss the report recommendations with any of the CSEC team.

COMMUNICATION SYSTEMS EVALUATION CENTER

TITLE: COMMUNICATION INTERACTION *

COMPONENT NUMBER:

NUMBER OF POINTS: 10

GENERAL OBJECTIVE: To train participants to interact effectively with a student using an augmentative communication system.

SPECIFIC OBJECTIVES:

The participant will:

1. become familiar with theoretical issues and research related to augmentative communication and communication interaction.
2. develop strategies for assessing communication interaction.
3. establish goals directed toward enhancing communication interaction.
4. evaluate communication environments in regard to their usefulness in developing communication interaction.
5. design communication interaction tasks to be completed in classroom, therapy, home and community settings.

DESCRIPTION OF ACTIVITIES:

Information will be presented through a lecture format, videotapes, practical activities, homework projects and supplemental readings. The course is designed with six hours of lecture, two hours of demonstration videotapes, one hour of practical application and one hour of pre-test and post-test. The demonstration videotapes have been developed by and feature the presenter and are specifically designed as an instructional component to introduce new material. The videotapes will be made available at a designated location to be viewed by the participants while under direct supervision. In order for participants to internalize concepts presented, practical applications will be completed. Two to three hours of supplemental readings can be expected and will be provided prior to and during the workshop. Homework assignments will be made and returned to the instructor at a designated later date.

EVALUATION CRITERIA:

A pre-test will be administered prior to the workshop to assess each participant's entry level skills. A parallel post-test will be completed and participants will be considered successful, as determined by the workshop presenter, upon receiving 80% accuracy on the post-test.

*Check with the Communication Systems Evaluation Center for a current listing of workshops offered.

CRC VISUALLY IMPAIRED WORKSHOP MODEL

TITLE: ADVANCED APPLE ACCESS WORKSHOP

OBJECTIVES: Advanced skills in word processing, tactile graphics, and an introduction to telecommunications.

CONTENT: Advanced word processing features of BEX
* auto set up sequences
* clipboard
* advanced formatting

Advanced features of Magic Slate
* importing files from other word processors and printing them in Magic Slate's 20 column mode

Tactile Graphics
* editing pictures
* labeling tactile graphics in braille

Telecommunication
* ProTerm with Echo and/or 40 column

LENGTH: 3 1/2 days

AUDIENCE: Teachers of the visually impaired

MAXIMUM PARTICIPANTS: 15 (depends on number of computers and availability of assistants)

PREREQUISITE: Basic literacy and some experience with computers

CRC VISUALLY IMPAIRED WORKSHOP MODEL

TITLE: PORTABLE TALKING COMPUTERS

OBJECTIVES: Demonstrate advantages/disadvantages of portable talking computers and compare with talking IIe.

CONTENT: On the Small Talk and KeyNote, demonstrate

* voice features
* word processing features
* other applications
* printing to external printers
* limitations
* advantages/disadvantages

LENGTH: 2 hours

AUDIENCE: Teachers of the visually impaired

MAXIMUM PARTICIPANTS: 10

PREREQUISITES: Experience with talking word processors on Apple or IBM would be helpful.

CRC VISUALLY IMPAIRED WORKSHOP MODEL

TITLE: EDUCATIONAL APPLE SOFTWARE FOR BLIND AND VISUALLY IMPAIRED STUDENTS

OBJECTIVES: Introduce teachers to currently available speech, braille, and large print output programs

Demonstrate advantages/disadvantages of various features of talking software

CONTENT:

- Talking Writer
- Hangman
- BEX
- Early Learning
- Fun with Math
- Type Talk
- Tall Talk Screens
- Magic Slate
- SEI

LENGTH: 2 - 3 hours

AUDIENCE: Teachers of the Visually Impaired

MAXIMUM PARTICIPANTS: 30

PREREQUISITES: Basic computer skills

CRC VISUALLY IMPAIRED WORKSHOP MODEL

TITLE: BEX TRAINING

OBJECTIVES: Teach teachers to use BEX to transcribe print into large print and braille

Teach teachers to teach students to use BEX as a word processor for their school work

CONTENT: Introduction to BEX, editing, translating, printing, editing with Echo, troubleshooting, braille printers, configurations

LENGTH: 1 - 2 days

AUDIENCE: Teachers/Transcribers

MAXIMUM PARTICIPANTS: 1 to 2 per computer

PREREQUISITE: Basic computer skills

CRC VISUALLY IMPAIRED WORKSHOP MODEL

TITLE: SUMMER INSTITUTE

OBJECTIVES: Prepare teachers of the visually impaired to use microcomputers with their students

CONTENT:

BEX	Magic Slate
Echo	tactile graphics
educational software	educational applications
ethical considerations	basic interfacing

LENGTH: 3 1/2 days

AUDIENCE: Teachers of the visually impaired with little or no previous experience with speech, braille, and large print access

MAXIMUM PARTICIPANTS: 15 (depends on number of computers and availability of assistants)

PREREQUISITE: No previous computer skills necessary

CRC VISUALLY IMPAIRED WORKSHOP MODEL

TITLE: TACTILE GRAPHICS

OBJECTIVES: Teach teachers to create computer-generated tactile graphics

CONTENT: Uses/applications of tactile graphics, creating pictures with PowerPad, storing/printing PowerPad pictures, creating pictures with a Mouse, adapting MousePaint with Braillefont, labeling pictures with braille labels

LENGTH: 1/2 day to 1 day

AUDIENCE: Teachers of the visually impaired

MAXIMUM PARTICIPANTS: 1 - 2 per Mouse or PowerPad

PREREQUISITE: Basic computer skills

CRC HEARING IMPAIRED WORKSHOP MODEL

TITLE: MAKE THAT SOFTWARE DO MORE

OBJECTIVE: Demonstrate how teacher made activities can enhance the use of software

CONTENT:
* Lecture (discuss limitations of current software)
* Demonstrate software with teacher made activities
* Hands on with activity sheet for teachers to follow for creating their own activities
* Summary

SOFTWARE: (some examples) Creative Contraption, Story Book, Science Island, Oregon Trail

LENGTH: 4 - 6 hours

APPROPRIATE AUDIENCE: Teachers of the hearing impaired

MAXIMUM PARTICIPANTS: Two teachers per computer

PREREQUISITES: Teachers should possess basic literacy and have some experience with software

CRC HEARING IMPAIRED WORKSHOP MODEL

TITLE: APPROPRIATE SOFTWARE FOR LANGUAGE DEVELOPMENT

OBJECTIVES: Demonstrate a variety of programs utilizing interactive design and hierarchy of use

Demonstrate techniques that promote language experiences such as use of large T.V. and use of a program to draw out language

CONTENT:
* Lecture - why do it differently?
* Demonstrate software
* Demonstrate techniques:
  large T.V.
  program as language experience
* Hands on time for teachers
* Summary

SOFTWARE: (some examples) Creative Contraption, Muppetville, Tigers Tale, Create With Garfield, Fix It

LENGTH: 1 day

AUDIENCE: Teachers of the hearing impaired with some computer experience

MAXIMUM PARTICIPANTS: Two teachers to each computer

PREREQUISITES: Basic literacy and some experience with computers

CRC HEARING IMPAIRED WORKSHOP

TITLE: USE OF WORD PROCESSOR FOR LANGUAGE DEVELOPMENT

OBJECTIVE: Demonstrate variety of word processors and activities to develop language skills

CONTENT:
* demonstrate variety of word processors
* present examples of language activities
* design language actvities
* produce language files on a word processor
* produce related support materials

SOFTWARE: Magic Slate, Fred Writer, Appleworks, MECC Writer

LENGTH: 1 day

AUDIENCE: Teachers of the hearing impaired

MAXIMUM PARTICIPANTS: One per computer

PREREQUISITES: Knowledge of word processing on at least one word processor

CRC HEARING IMPAIRED WORKSHOP MODEL

TITLE: USE OF CARTOON MAKERS AND GRAPHIC PROGRAMS IN THE CLASSROOM

OBJECTIVES: Teachers will be able to produce activities for their classrooms using cartoon makers and graphic programs

CONTENT:
* demonstration of programs
* present variety of techniques
* develop activities for classroom
* hands on time for teachers to produce activities

SOFTWARE: (suggested) Deluxe Edition of Create With Garfield, Walt Disney Comic Strip Maker, Teddy Bear.rels of Fun, Print Shop, Dazzle Draw

LENGTH: 1 day

MAXIMUM PARTICIPATION: Two teachers per computer

PREREQUISITES: Basic computer literacy

CRC HEARING IMPAIRED WORKSHOP MODEL

TITLE: USING A DATABASE IN THE CURRICULUM

OBJECTIVE: Teachers will be able to demonstrate use of database in their classroom.

CONTENT:
* demonstration of database uses
* identify objectives for lessons
* design database template
* evaluate template against objectives
* produce database
* developing database for each teacher

SOFTWARE: Appleworks, MECC DataQuest

LENGTH: 1 day

APPROPRIATE AUDIENCE: Teachers of the hearing impaired

MAXIMUM PARTICIPATION: One per computer

PREREQUISITES: Basic knowledge of computer use

CRC HEARING IMPAIRED WORKSHOP MODEL

TITLE: INTEGRATION OF SOFTWARE

OBJECTIVE: Demonstrate unit approach to use of specific software

CONTENT: Lecture and hands on activities with brainstorming to help teachers develop ideas based on selected software.

SOFTWARE: (some examples) Oregon Trail, Where In The USA Is Carmen Sandiego, Story Book

LENGTH: 1 day

AUDIENCE: Teachers of the hearing impaired

MAXIMUM PARTICIPANTS: two per computer/max. 15

PREREQUISITES: Experience with software appropriate for the hearing impaired

FLORIDA SCHOOL FOR THE DEAF AND THE BLIND

THE COMPUTER RESOURCE CENTER

SAMPLE

MONITOR

VOLUME 3, NO. 2
SPRING 1987

John Mark Leach-
Coordinator, CRC

Bob Stern-
Evaluator/Technologist

Cathy Mack-
Resource Specialist for
the Visually Impaired

Bernie MacDonald-
Resource Specialist for
the Hearing Impaired

Tammy Nordyke-
Secretary

Do You Really Know What the CRC Can Do For You?

The CRC is nearing the end of its first year with a complete staff. We provide services to K-12 teachers of the visually impaired and the hearing impaired and we would like to inform you of these services in our sincere efforts to meet your educational computer needs:

1. Five statewide regional meetings held annually to provide an overview of software and hardware for use with visually impaired and hearing impaired students.
2. In-service training to small groups of teachers.
3. In-service with teachers in a one on one setting based on teachers' needs and availability of a CRC staff member.
4. In-depth workshops held in the CRC lab.
5. Product summary information distributed on specific access devices and peripheral hardware.
6. Detailed software reviews published and distributed annually addressing the needs of hearing impaired students.
7. Braille and large print computer access equipment available for a short loan

FDLRS_____

Draft

ITTRU WORKSHOP REQUEST FORM Handout #J-1

FDLRS Contact Person _____ Telephone # _____

Workshop Date _____ Workshop Time(s) _____

Workshop Location _____
(Please provide map)

Workshop Content (Please be as specific as possible) _____
_____
_____
_____

Teacher/Specialist Audience (estimate # of personnel):

_____ Regular Ed. Teachers _____ Physical Therapists _____ Occ. Therapists

Special Education Teachers: _____ Physically Handicapped

_____ Visually Handicapped _____ Hearing Impaired

_____ Profoundly Mentally Handicapped _____ Severly Emotionally Disturbed

_____ Autistic _____ Multiply Handicapped

Will all attendees be considered to be 'Computer Literate'?_____
If not, please explain._____

Any other information that may be helpful to ITTRU personnel in preparing for this workshop._____
_____
_____
_____
_____

CONFIRMATION: DATE_____ TIME(S)_____ BY _____

ITTRU (Instructional Technology Technical Resource Unit)
3530 Wilkinson Road , Sarasota, FL 34231
(813)953-5000 x287 Suncom: 529-1287

ITTRU (Instructional Technology Technical Resource Unit) Workshop Evaluation Form

Personnel Type:

- ESE Educator ○
- Regular Educator ○
- Support ○
- Community Agency Representative ○
- Parent of Exceptional Student ○

DIRECTIONS FOR COMPLETING THIS FORM:

TO INSURE PROPER CREDIT, PLEASE DARKEN IN THE APPROPRIATE BUBBLE FOR YOUR PERSONNEL TYPE. ALSO, YOU MUST DARKEN A BUBBLE FOR EACH EVALUATION ITEM. NUMBER 2 PENCIL MUST BE USED WHEN COMPLETING THIS FORM.

INSTRUCTIONAL

Name:

Title of Activity/Contact Person	DATE OF ACTIVITY:	ACTIVITY NUMBER:

CODE
1 - STRONGLY AGREE
2 - AGREE
3 - DISAGREE
4 - STRONGLY DISAGREE
5 - DOES NOT APPLY

1. This activity helped me to update my competency in this area.	① ② ③ ④ ⑤
2. I feel prepared to apply what I have learned in this activity.	① ② ③ ④ ⑤
3. The instructor was prepared and effective.	① ② ③ ④ ⑤
4. Overall, this workshop was outstanding.	① ② ③ ④ ⑤

5. State one idea that you learned in this activity and can implement in your job.

6. What did you like about this activity?

7. How do you think this activity could be improved?

COMMENTS:

Note: Instructor should make every effort to make evaluation anonymous.

FDLRS Contact Person_____ Title_____ FDLRS_____

Draft

Handout #J-1b

REQUEST FOR STUDENT EVALUATION - PART I

The main objective of the Instructional Technology Technical Resource Unit is to explore the use of computers for instructional purposes. Emphasis is on the the needs of the physically handicapped, to include visually impaired and hearing impaired students, as well as other students who would benefit from the use of adaptive and assistive devices in instructional technology applications.

Project activities and services include the evaluation of students for optimum use of technology. This includes, but is not limited to, suggestions for:

- -assistive device selection
- -type of computer and monitor
- -positioning (with OT/PT assistance)
- -typical software appropriate for the individual student, in keeping with academic and non-academic goals.

Name of person completing form _____Title_____
Student's Name _____ Age _____ School _____
Requested Evaluation Site _____

Service Criteria Statements:

1. The student is enrolled in an Exceptional Student Education Program, or has a valid I.E.P. Yes___ No___
2. The student shows evidence of being able to benefit from the use of a computer for instructional purposes. Yes___ No___
3. The student demonstrates an understanding of the basic interactive skills such as causality and object permanence. Yes___ No___
4. The student has physical, sensory or intellectual deficits which severely inhibit normal computer access or use. Yes___ No___

Check all known or suspected impairments:

Physical_____ Hearing_____ Visual_____ Autistic_____ Emotional_____
Mentally Impaired: Profound_____ Trainable_____ Educable_____
Learning Disabled _____ Other_____ _____

Check all assistive devices presently used:

Electric Wheelchair _____ Wheelchair/Stroller _____ Braces/Crutches _____
Hearing Aid _____ Glasses_____ corrected to 20/20?_____ Computer _____
Communications Devices (specify)_____

Check all services received:

Physical Therapy _____ Occupational Therapy _____ Speech Therapy _____
Other_____ _____

Approval:

I request that ITTRU personnel conduct an evaluation for the above named student. I will endeavor to have the classroom teacher, occupational or physical therapist, and any other support personnel available during the evaluation.

☐ District ESE Admin.
Signature_____ ☐ FDLRS Center Director Date_____

Send completed form to: ITTRU (Instructional Technology Technical Resource Unit)
3530 Wilkinson Road, Sarasota, FL 34231 (813)953-5000 x287 Suncom: 529-1287

FDLRS_____

Draft Handout #J-1c

REQUEST FOR STUDENT EVALUATION - PART II

This first page should be filled out by the classroom teacher prior to the evaluation.
A copy of the Parent Permission Form for this evaluation must be attached.

Classroom Teacher_____ Date_____
Student Name_____
Computer availability: (School) Mfr/Model_____ Access Time_____
Adaptations _____
Computer availability: (Home) _____ CSEC Evaluation (Yes/No) _____

THE FOLLOWING INFORMATION IS REQUESTED TO ASSIST IN THE SELECTION OF HARDWARE, SOFTWARE AND ADAPTIVE DEVICES FOR THE STUDENT:

Basic Program Participation

Hrs/Week	Reason - Subject	Special Aids Services/Equipment	Provided By

ESE / Other Supprt Services

Program	Hrs/Week	Provided By	Begin Date

Present Levels of Performance

Statements and scores which describe the student's performance

Academic: (Reading, Math, Communication, Etc.)_____

Non-academic: (Social, Emotional, Mobility, Self-help, Daily Living Skills, Etc.)_____

Annual Goals and Short Term Objectives

Goal _____
Objective_____
Objective_____
Goal _____
Objective_____
Objective_____

Other Information

Send completed form to: ITTRU (Instructional Technology Technical Resource Unit)
3530 Wilkinson Road, Sarasota, FL 34231 (813)953-5000 x287 Suncom: 529-1287

Student Name _____ FDLRS_____

Draft Handout #J-1d

STUDENT/TECHNOLOGY EVALUATION SUMMARY

This form outlines student contact information, from the initial visit by ITTRU personnel to follow-up visits, initiated either by local or project personnel.

Initial Evaluation Commentary & Recommendations

HARDWARE	SOFTWARE	ADAPTIVE DEVICES

Evaluator _____ Date _____ Evaluation Site _____

Follow-up #1

Include any changes in participation, services and levels of performance. Address progress towards, and/or revisions to Goals and Objectives. _____

Evaluator _____ Date _____ Evaluation Site _____

Follow-up #2

Include any changes in participation, services and levels of performance. Address progress towards, and/or revisions to Goals and Objectives. _____

Evaluator _____ Date _____ Evaluation Site _____

Follow-up #3

Include any changes in participation, services and levels of performance. Address progress towards, and/or revisions to Goals and Objectives. _____

Evaluator _____ Date _____ Evaluation Site _____

ITTRU (Instructional Technology Technical Resource Unit)
3530 Wilkinson Road, Sarasota, FL 34231 (813)953-5000 x287 Suncom: 529-1287

This is a copy of the three-part [illegible] permission form used by [illegible] County.
Note that the "Procedural Safeguards" appears on the reverse side.

Handout #J-1e

SCHOOL BOARD OF _____ COUNTY, FLORIDA

CONSENT FOR

INDIVIDUAL EVALUATION

_____ Date: _____
(Parent Name)

Student Name:

_____ _____

_____
(Address) (Zip) Student #: _____

Dear: _____

District School personnel have carefully reviewed your child's educational records and recommended he/she be evaluated to help plan an educational program which best meets his/her needs.

The categories checked below will be evaluated.

- ☐ Educational Evaluation - assessment of current academic levels, strengths and weaknesses.
- ☐ Psychological Evaluation - assessment of ability, achievement and personality.
- ☐ Communication Skills - assessment of language, speech and hearing.
- ☐ Vision Screening - assessment of visual acuity.
- ☐ Specific Learning Disabilities - assessment of learning abilities and processes.
- ☒ Other: I.T.T.R.U. (Instructional Technology Technical Resource Unit) Evaluation - assessment for optimum use of technology, including assistive devices and computer selection and identification of typical software appropriate for the student, in keeping with academic and non-academic goals.

Both federal and state regulations require that you be informed of your rights in this matter. These rights are described for you on the reverse side of this page titled "Procedural Safeguards." Please read this section carefully before you complete this form. Call the contact person named below if you have any questions.

FDLRS Contact Person _____

Address _____

Phone _____

Please check appropriate statement, sign in the space provided, and return the white copy to the contact person named above. The yellow copy is for your records.

_____ I give my permission for testing.

_____ I do not give my permission for testing.

_____ I request a conference to discuss this evaluation before granting permission.

_____ _____
(Parent signature) (Date)

This consent shall be valid for a period of one year unless withdrawn by parent/guardian in writing.

PROCEDURAL SAFEGUARDS

It is very important for you to understand that you have the following rights:

1. You may examine all records related to the referral, identification, evaluation of educational placement of your child. You are also entitled to:

   a. explanations and interpretations of the records
   b. copies of the records - fees for copies must be based upon the cost of reproduction
   c. seek correction of your child's records if you believe they are not accurate
   d. give consent prior to the disclosure of certain information
   e. request a hearing if you and the school district cannot reach agreement regarding the information in your child's records. (The contact person is specified in the district's procedures on Student Records.)

2. You may request and obtain an independent evaluation:

   a. The evaluation will be at public expense if:

      (1) you disagree with an evaluation obtained by the school district. However, the school district may request a hearing to show that its evaluation is appropriate. If the hearing officer rules in your favor, the school district will pay for the evaluation.

      (2) a hearing officer conducting a hearing related to any action taken by the school district concerning special education requests an independent evaluation.

      (3) the local school district agrees to pay for an independent evaluation. Criteria used for obtaining special education must be the same as those used by the district when it initiates an evaluation.

   b. The evaluation will be at the parent's expense if:

      (1) the parent voluntarily assumes the cost

      (2) the parent disagrees with the school's evaluation, and an impartial hearing officer decides in favor of the school district.

3. If you pay for an independent evaluation, you have the choice to introduce the evaluation for consideration by the school system or at a hearing. In both cases, if you choose to offer the evaluation, it must be considered by the school personnel or the hearing officer in their decision regarding your child.

4. You may refuse to agree to the pre-placement evaluation. In this case, the school district may request a hearing to settle the disagreement.

5. You may refuse to agree to a school district's proposed placement or a refusal to place your child in an exceptional education program. In this case, the school district may request a hearing to settle this disagreement.

6. You may withdraw your agreement to allow an evaluation or placement at any time.

7. You will be notified of any other action the school district proposes to take regarding further identification, evaluation, change of placement, or provision of an education of your child.

8. Should you and the school district be unable to reach an agreement regarding the proposed identification, evaluation, placement or provision of an education for your child, both you and the school district have the following rights:

   a. to request an impartial due process hearing, with the results of that hearing mailed to you within forty-five (45) days after the receipt of that request. Request for a hearing is made to the Superintendent in writing.

   b. to have the hearing conducted by an impartial hearing officer from the Division of Administrative Hearings.

   c. to be accompanied and advised by an attorney or other individuals with special knowledge of exceptional children.

   d. to present evidence or to prevent the introduction of evidence that has not been provided to the other party at least five (5) days prior to the hearing.

   e. to question and require the attendance of witnesses.

   f. to obtain a written or taped record of the hearing.

   g. to obtain the written findings and the decision of the hearing officer.

9. In addition to the rights above, you have the following rights regarding hearings:

   a. to have your child present.
   b. to open the hearing to the public, upon request - the hearing will be closed to the public, unless you request that it be open.
   c. to receive from the school district information about free or low-cost legal and other appropriate services. This information will be provided to you if you ask, or if a hearing is requested by either you or the school district.

10. You may appeal the decision of the hearing officer to the First District Court of Appeal within thirty (30) days of the date of the hearing order.

11. Your child will remain in his/her present program during all hearings and appeals, unless you and the school district agree to another placement. If your child is not attending school, you may agree to place him/her in a public school program until all hearings are completed.

12. An individual will be assigned to act as a surrogate parent to represent your child in providing an education if:

    a. the child is a ward of the state;
    b. no parent/guardian can be identified;
    c. no parent/guardian can be located.

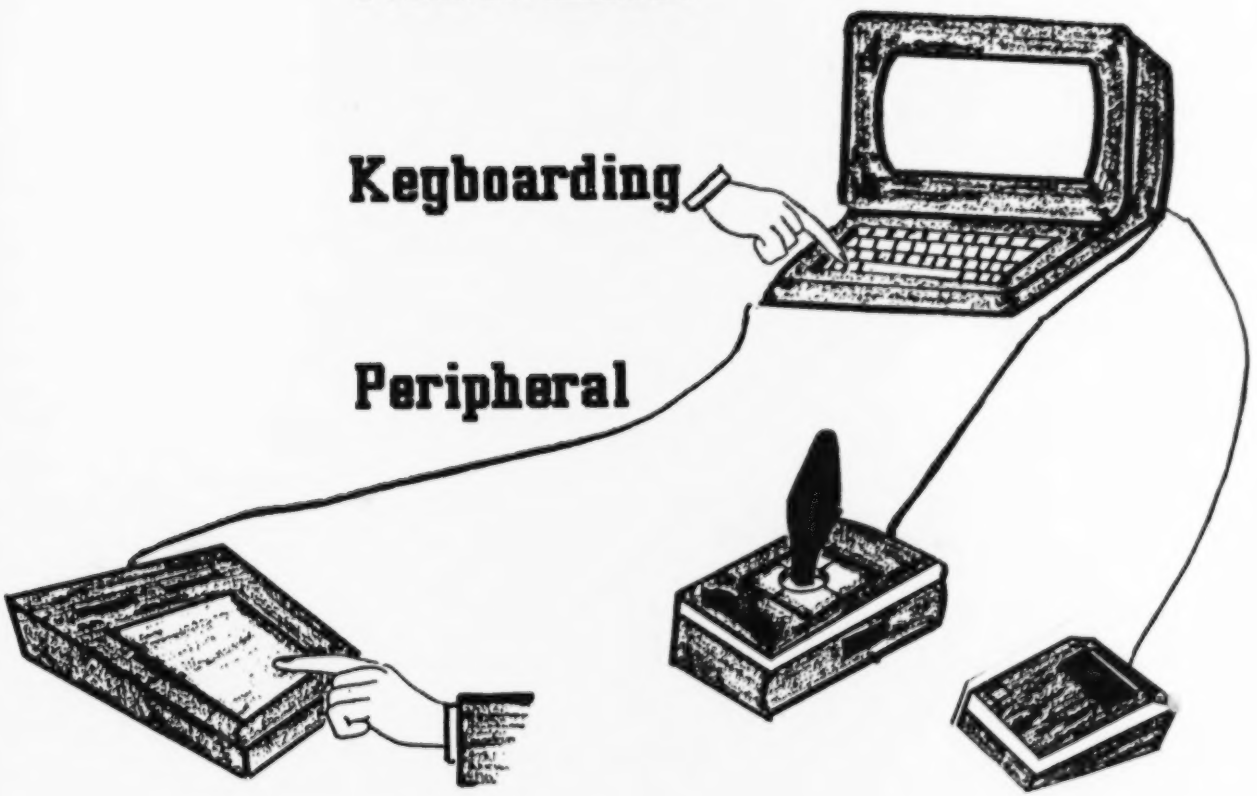
DEVELOPMENTALLY DELAYED

Software

Visual/motor

Kegboarding

Peripheral



EMOTIONALLY HANDICAPPED

Use computers to:

Create a positive

learning environment

Use computers to:

Motivate behavior

HEARING IMPAIRED

Software

Modem

LEARNING DISABLED

Word processing/
Spelling Checker

Keyboarding

Simple text

Visual/motor

PHYSICALLY IMPAIRED

Keyboard

Rapid Repeat

Multi-Strike

Motor Control

Membrane

Template

Pointer Device

PHYSICALLY DISABLED

Adaptive Firmware Card

Switches

Touch Tablets

Speech Synthesizer

Scanning

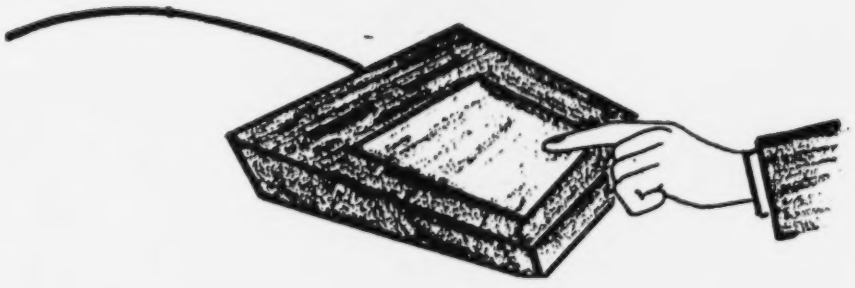
Programming

PHYSICALLY IMPAIRED

Alternate Keyboards:

Muppet Keys

Koala Pad



Powerpad

Touch Window

Unicorn Keyboard

PHYSICALLY IMPAIRED

Voice Recognition

Speech Synthesis

VISUALLY IMPAIRED

Size of Print

Large Screen

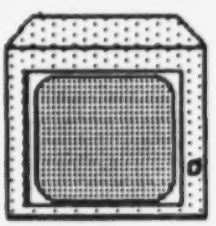
Speech Synthesis

Optacon
or
Braille Print Interface

OUTPUT

Definition: The means of getting processed information out of the computer.

The most common output devices are the monitor

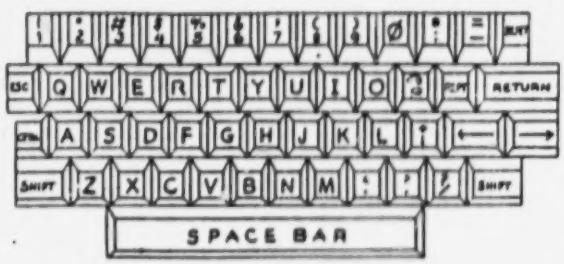


and the printer.

INPUT

Definition: A means of putting information into the computer.

The most common input device is the Keyboard.



INPUT DEVICES

Physically Impaired:

Switches:

Toggle Switch

Air Cushion Switch

Brow Wrinkle Switch

Mercury Switch

Video Pointing Devices:

Joystick

Light Pen

Mouse

Touch Tablet

Touch Screen

Voice Recognition

INPUT DEVICES

Physically Impaired:

Direct Selection

Scanning

INPUT DEVICES

KEYBOARD ADAPTATIONS :

Membrane

Template

Color Coding

Raised Letters

Enlarged Keyboards

OUTPUT DEVICES

Visually Impaired:

Monitor :

Large Print Display

Optacon

Printer:

Braille Embossing Printer

Speech Synthesis:

(Selection of software is critical)

OUTPUT DEVICES

Monitor

Printer

Speech Synthesis

TURNING ON TO SWITCHES

handicapped children are . . .

Use with Transparency #C-2
SCRIPT

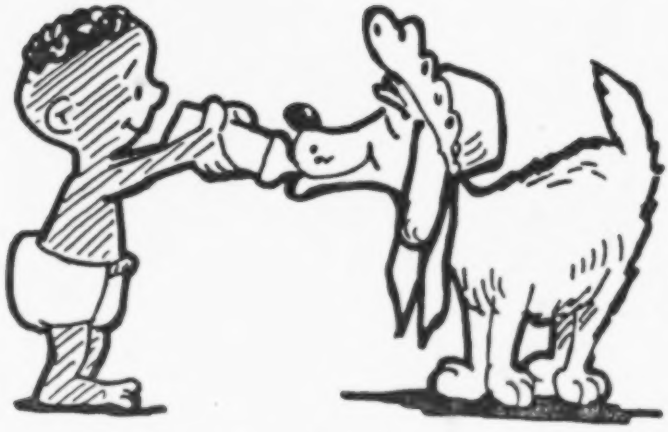
"SEVERELY AND PROFOUNDLY HANDICAPPED CHILDREN ARE UNIQUE INDIVIDUALS. EACH CHILD'S ABILITIES, DISABILITIES, AND PERSONALITY, INFLUENCE THEIR DEVELOPMENT. PARENTS, TEACHERS, AND THERAPISTS, MUST DESIGN THEIR APPROACHES TO MEET THE INDIVIDUAL NEEDS OF THE CHILD. MANY TIMES, THINGS THAT HAVE WORKED BEAUTIFULLY WITH ONE CHILD, DO NOT SEEM TO HAVE ANY EFFECT ON ANOTHER CHILD. THEREFORE, PEOPLE WHO CARE FOR AND WORK WITH THESE CHILDREN, MUST CONTINUALLY EXPERIMENT AND CREATE NEW ALTERNATIVES TO HELP THESE CHILDREN REACH THEIR POTENTIALS."

LINDA J. BURKHART

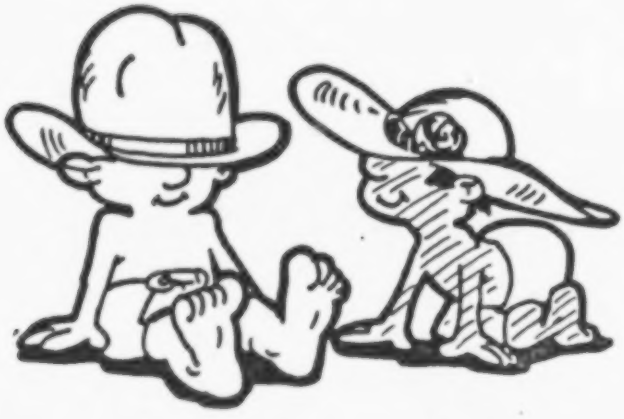
HOMEMADE BATTERY POWERED TOYS AND EDUCATIONAL DEVICES FOR SEVERELY HANDICAPPED CHILDREN

Transparency #G-3

explore



manipulate



play

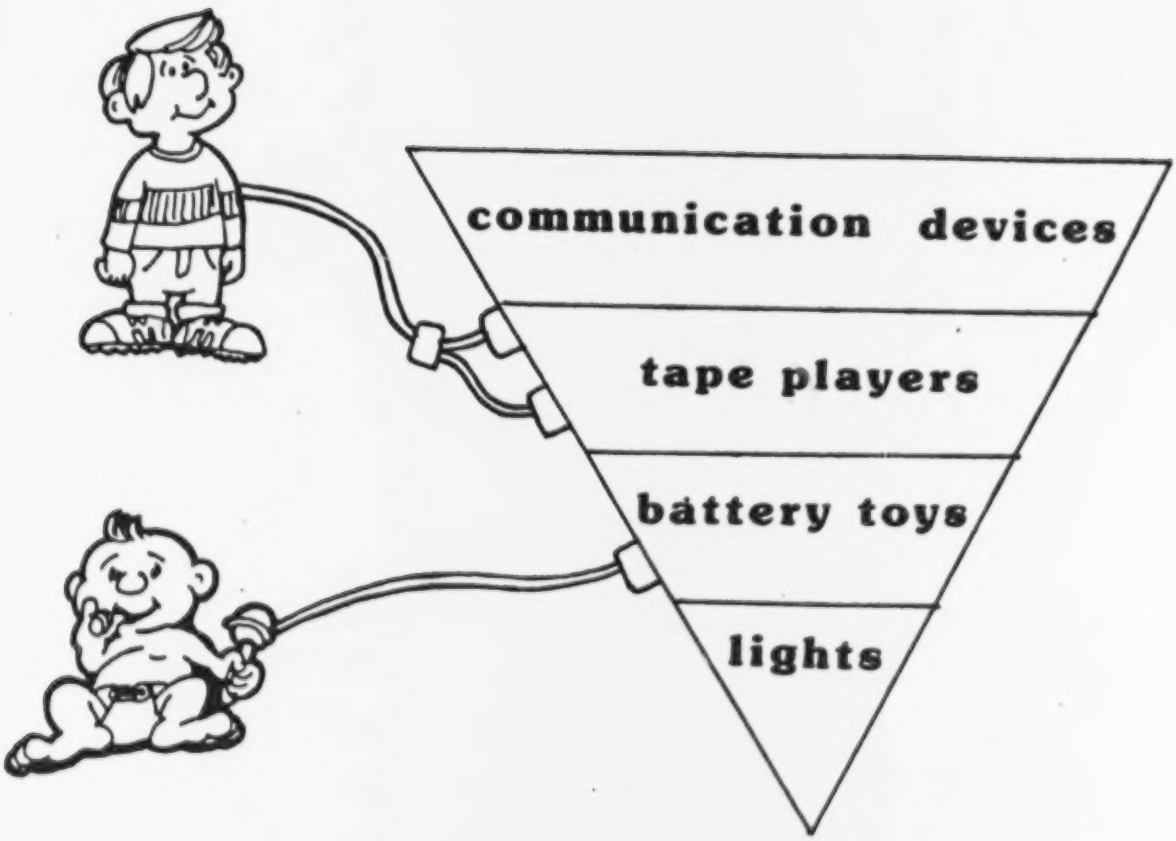
Use with Transparency #G-3
SCRIPT

"ONE FRUSTRATION THAT I HAVE OBSERVED IN SEVERELY HANDICAPPED CHILDREN IS THAT GIVEN AN ENVIRONMENT FOR NON-HANDICAPPED CHILDREN, THEY ARE NOT ABLE TO EXPLORE, MANIPULATE, AND PLAY WITH THEIR WORLD. NON-HANDICAPPED CHILDREN LEARN EASILY FROM THEIR ENVIRONMENT BECAUSE THEY ARE FREE TO TEST OUT, TO THEIR "HEARTS CONTENT", THE REACTIONS AND INTERACTIONS OF THEIR SURROUNDING. SOME OF THE CONSEQUENCES FOR THE SEVERELY HANDICAPPED TO THIS PROBLEM MAY RESULT IN LESS CONSTRUCTIVE STIMULATION TO THE CHILD'S BRAIN, A MORE PASSIVE, DEPENDENT ATTITUDE TOWARD THE ENVIRONMENT AND INCREASED SELF-STIMULATION."

LINDA J. BURKHART

HOMEMADE BATTERY POWERED TOYS AND EDUCATIONAL DEVICES FOR SEVERELY HANDICAPPED CHILDREN

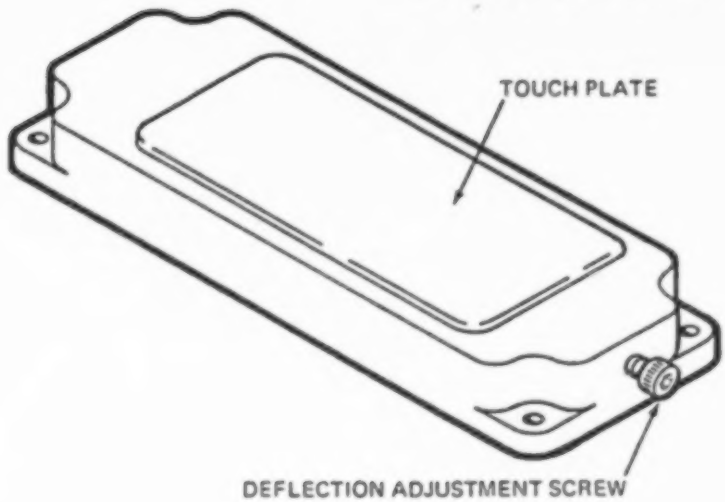
Transparency #G-4



ZYGO

COMMUNICATION
SYSTEMS
&
ASSISTIVE DEVICES

CM-4
TOUCH SWITCH



ZYGO

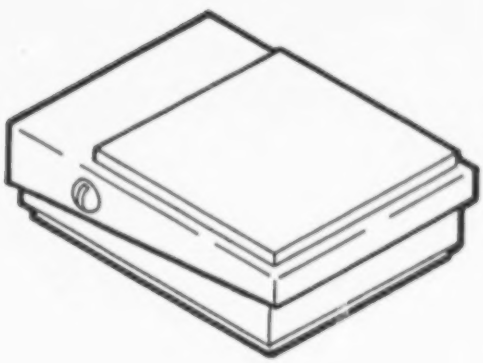
COMMUNICATION
SYSTEMS
&
ASSISTIVE DEVICES

CM-5
THUMB SWITCH

ZYGO

COMMUNICATION
SYSTEMS
&
ASSISTIVE DEVICES

CM-1
TREAD SWITCH

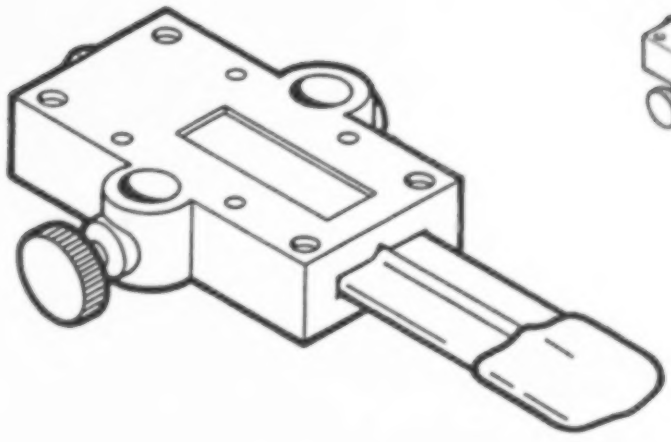


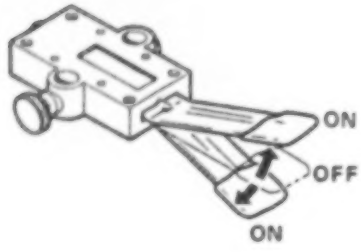
ZYGO

COMMUNICATION
SYSTEMS
&
ASSISTIVE DEVICES

CM-7
SHORT LEAF SWITCH

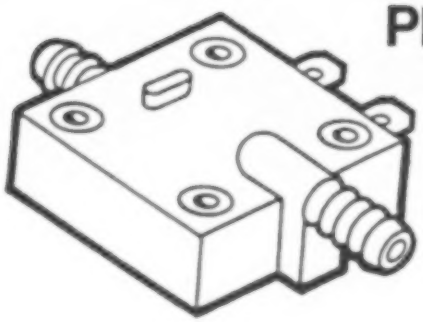
CM-2
LEAF SWITCH

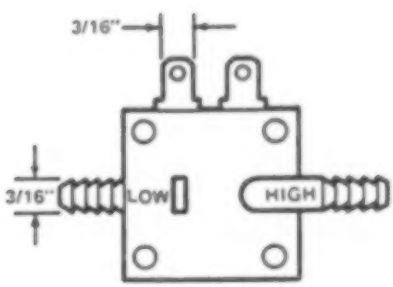




ZYGO
COMMUNICATION SYSTEMS & ASSISTIVE DEVICES

CM-3
PNEUMATIC SWITCH





CM-3-2 SQUEEZE BALL AND TUBING:

C.S.E.C.

Communication Systems Evaluation Center Orlando

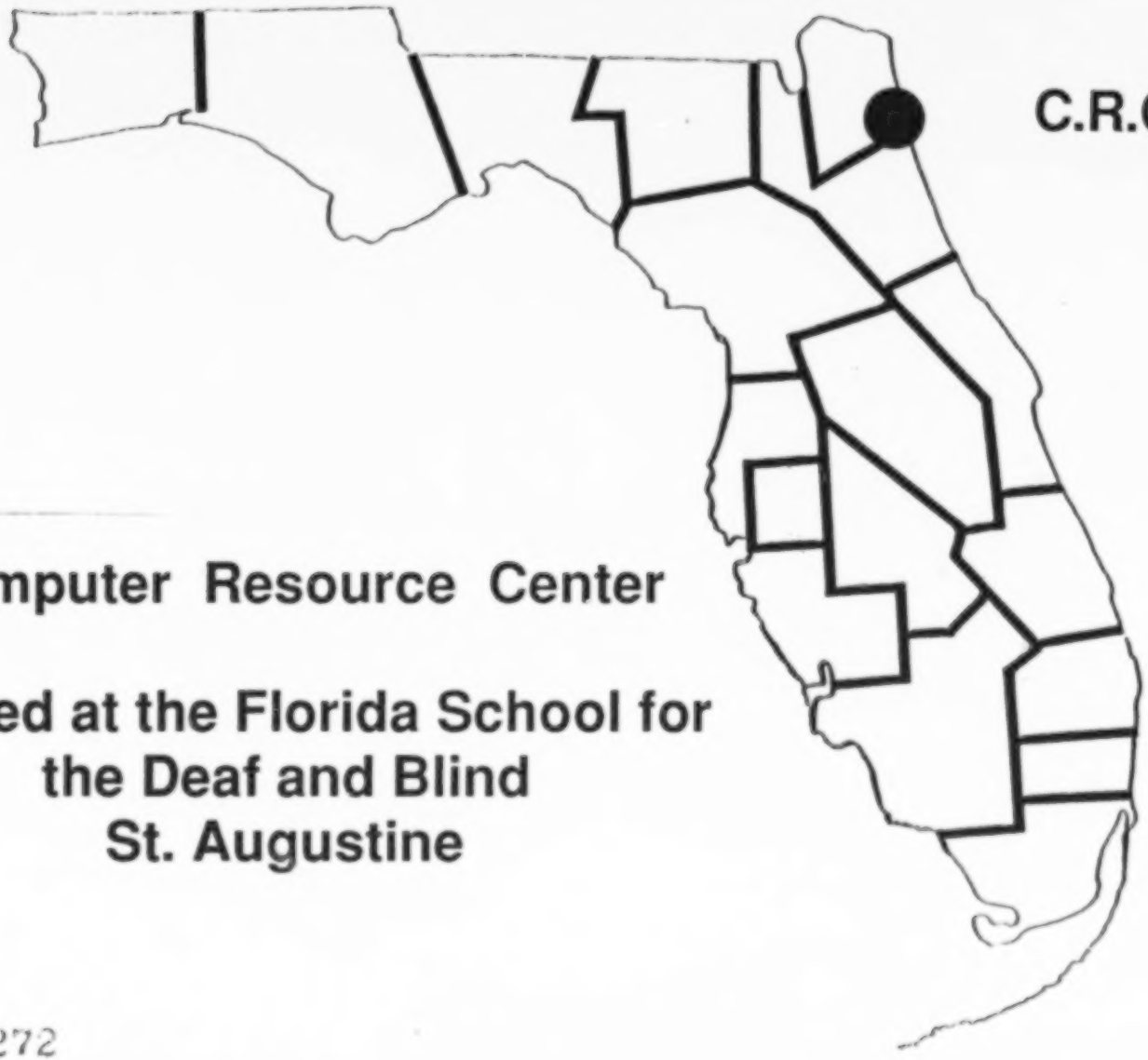
C.S.E.C.

Assistance to non-vocal students

Network support

- Student Evaluation
- Research/Development
- Information Dissemination
- Demonstration/Training
- Evaluation

Transparency #H-2



Computer Resource Center

Located at the Florida School for the Deaf and Blind St. Augustine

Transparency #I-1

C. R. C.

Computer Resource Center

Assisting the Hearing and Visually Impaired

Network Support

- Research/Development
- Information Dissemination
- Demonstration/Training
- Evaluation

Transparency #1-2

PROJECT I.T.T.R.U.

Instructional Technology and Technical Resource Unit Sarasota

Transparency #J-1

PROJECT I.T.T.R.U.

aka PROJECT C.A.I.S.H.

ADAPTIVE DEVICES/SOFTWARE INTERFACES

Network Support

- Research/Development
- Information Dissemination
- Demonstraton/Training
- Evaluation

Transparency #J-2